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CONTENTS

ENTOMOLOGY VOLUME XVIII

PAGE

No. 1. The genus *Ancistrotermes* (Isoptera). By W. V. HARRIS 1

No. 2. Revisional notes on the genus *Antanartia* (Lepidoptera : Nymphalidae). By T. G. HOWARTH 21

No. 3. Revisional notes on African *Charaxes* (Lepidoptera : Nymphalidae) Pt. III. By V. G. L. VAN SOMEREN 45

No. 4. Indo-oriental Horagini (Lepidoptera : Lycaenidae). By C. F. COWAN 103

No. 5. The genus *Rhipidocephala* (Diptera : Asilidae). By H. OLDROYD 143

No. 6. A list of the Odonata types described by F. C. Fraser, now in the British Museum (Natural History). By D. E. KIMMINS 173

No. 7. Revision of the genus *Orosius* Distant (Homoptera : Cicadelloidea). By M. S. K. GHAURI 229

No. 8. A revision of the genus *Anthene* from the Oriental Region (Lepidoptera : Lycaenidae). By G. E. TITE 253

No. 9. Revisional notes on African *Charaxes* (Lepidoptera : Nymphalidae) Pt. IV. By V. G. L. VAN SOMEREN 277

Index to Volume XVIII 317

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THE GENUS *ANCISTROTERMES* (ISOPTERA)

W. V. HARRIS

BULLETIN OF
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NATURAL HISTORY

THE GENUS *ANCISTROTERMES* (ISOPTERA)

BY

W. V. HARRIS xref.

Termite Research Unit,
Ministry of Overseas Development

Pp. 1–20; 18 *Text-figures*

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THE BRITISH MUSEUM (NATURAL HISTORY)
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TRUSTEES OF
THE BRITISH MUSEUM (NATURAL HISTORY)

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THE GENUS *ANCISTROTERMES* (ISOPTERA)

By W. V. HARRIS

CONTENTS

Page
INTRODUCTION 3
GENUS *ANCISTROTERMES* SILVESTRI 6
Key to Imagos 7
Key to Major Soldiers 7
DESCRIPTIONS OF SPECIES 9
ACKNOWLEDGEMENTS 20

SYNOPSIS

The history of the genus is discussed, and eight species are dealt with, of which two are described as new. Two species are placed in synonymy.

INTRODUCTION

ISOPTERA of the subfamily Macrotermitinae (Termitidae) occur in Africa south of the Sahara and in tropical Asia. They are characterized by the presence of fungus combs in chambers forming part of the nest system. The nests are mainly subterranean but some species, under favourable circumstances, build mounds.

In Africa four genera of Macrotermitinae, *Macrotermes*, *Odontotermes*, *Ancistrotermes* and *Microtermes*, are numerous and widely distributed. They are distinguished from the remaining six less-common genera by the comparatively slender mandibles of the soldier castes, with inner margins not serrated and with no more than a single marginal tooth. They form a series showing a progressive reduction in size, and in the number of antennal segments in all castes, and in the complexity of structure of their fungus combs.

Ancistrotermes is present throughout the extensive areas of savanna woodlands between latitudes 13° North and 23° South, at elevations below 1,600 metres a.s.l. It is common in the gallery forests within the savanna, but is uncommon in closed canopy rain forest on the one hand and in semi-desert thorn bush on the other. One species, *A. latinotus*, is closely associated with the *Brachystegia* etc. woodlands of eastern and southern Africa. The genus as a whole forms a significant part of the soil macro-fauna of a large part of Africa, and is, in addition, of economic importance due to attacks on young trees, especially *Eucalyptus* spp., on plantation crops such as tea, and on constructional timbers.

Silvestri proposed the name *Ancistrotermes* as a subgenus in 1912 and as a genus in 1914 for two West African termites, *Termes crucifer* Sjöstedt and *T. cavithorax* Sjöstedt. Later *A. latinotus* Silvestri from south-east Congo and Angola, *A. guineensis* from Portuguese Guinea and *A. periphrasis* from the Sudan were added. Two species, *A. lembomboensis* Fuller and *A. amphidon* Sjöstedt, are placed in synonomy for reasons given below. Two new species, *equatorius* and *microdens*, are described.

In view of the tentative nature of the original references and the absence of subsequent records, *A. crucifer* var. *diversana* Silvestri and *A. ?dubius* Sjöstedt are omitted from this study. It has not been possible to examine the specimens of *A. wasmanni* Snyder & Emerson, to which Wasmann gave the name *A. cavithorax* but included in his published description significant differences in the soldier mandibles. This brings the total number of species dealt with here to eight.

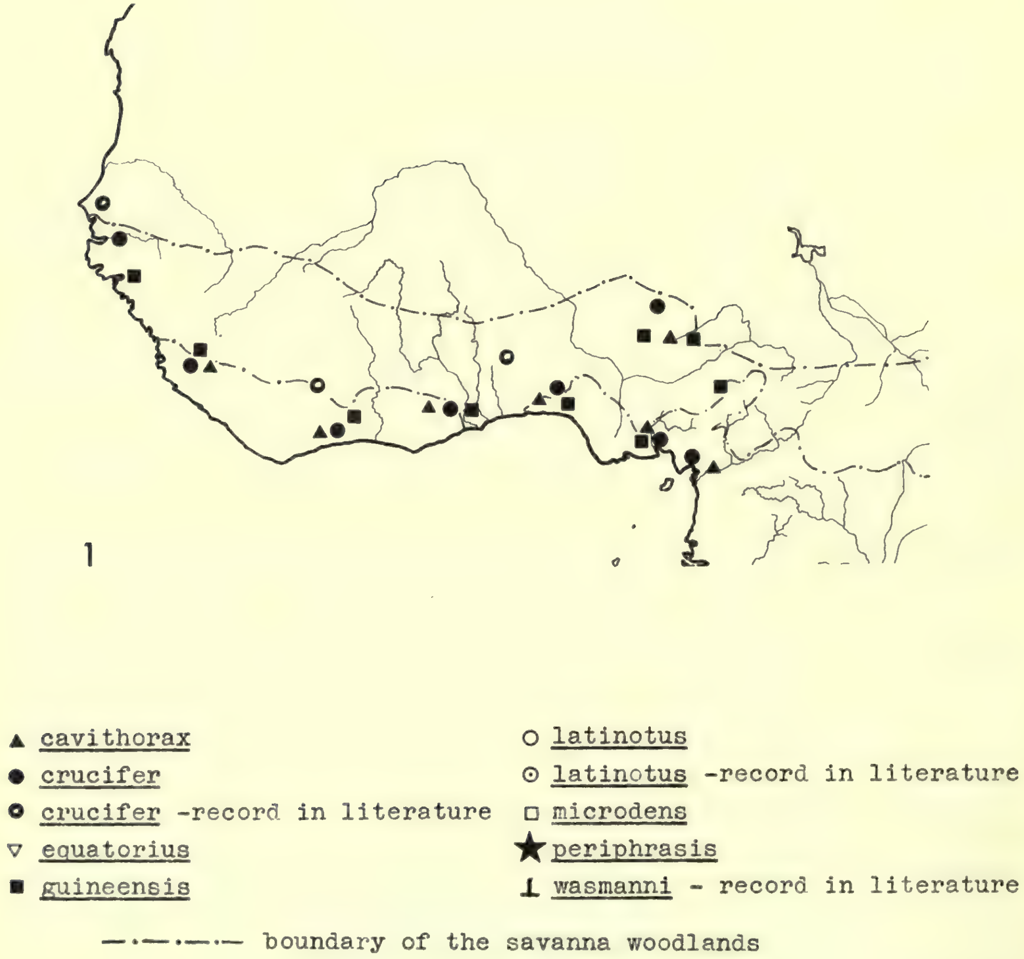
1
▲ cavithorax
● crucifer
⭘ crucifer -record in literature
▽ equatorius
■ guineensis
○ latinotus
⊙ latinotus -record in literature
□ microdens
★ periphrasis
⊥ wasmanni - record in literature
—·—·—·— boundary of the savanna woodlands

FIG. 1. Distribution of *Ancistrotermes* in West Africa.

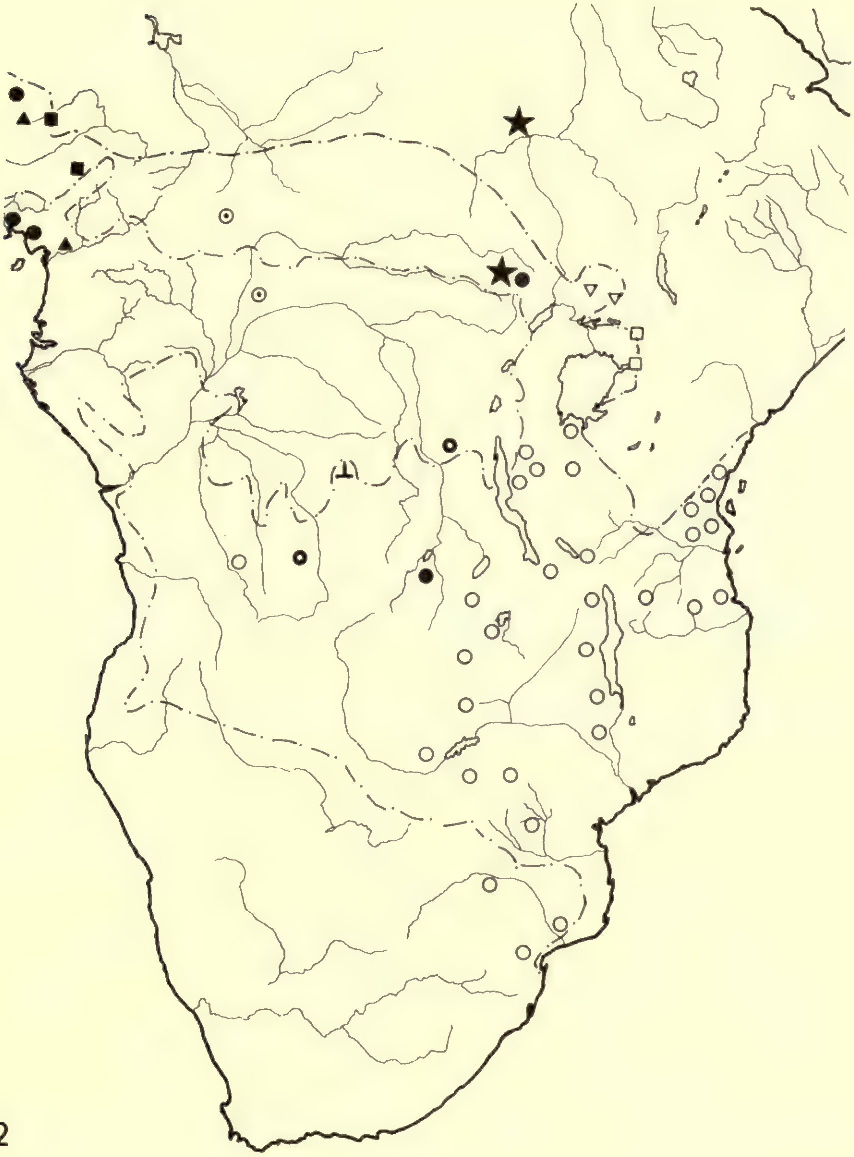

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FIG. 2. Distribution of *Ancistrotermes* in Central and South Africa.

ANCISTROTERMES Silvestri

Termes (*Ancistrotermes*) Silvestri, 1912, *Ann. Mus. Zool. Napoli* **3** (22) : 4.
Ancistrotermes Silvestri, 1914, *Bol. Lab. Zool. Portici* **9** : 17. [as genus]

Imago. Small (width of head including eyes from 1·58–1·86 mm., length of fore wing from 15–20 mm.) ; head oval ; clypeus inflated, distinctly paler than the rest of the head, with a dark median line ; eyes circular, large ; ocelli oval, comparatively large and close to the eyes ; labrum tongue-shaped with broadly rounded tip ; mandibles conforming to the general Macrotermitinae pattern, with no subsidiary tooth on the first marginal of the right mandible (also absent in *Odontotermes* and *Microtermes*) ; fontanelle a small circular spot ; antennae with 17 segments (19 in *Odontotermes* and 15 or 16 in *Microtermes*).

Pronotum approximately semicircular with anterior corners rounded and projecting forwards, and both anterior and posterior margins slightly sinuate. Wings similar to *Microtermes*, veins other than radius and radial sector only feebly chitinized, medius and cubitus not united at the base, weak branches usually present from medius towards radial sector.

Soldier. Distinctly dimorphic, the major soldiers having the head and mandibles in the range 1·50–2·40 mm., and the minor soldiers 1·14–1·90 mm.

Major soldier with head oval or laterally compressed ; mandibles robust with strongly incurved tips, left mandible with a small marginal tooth, right mandible with or without marginal tooth but usually with a small basal spur ; labrum not broader than long, pointed ; antennae with 15 segments (*Odontotermes* has 16 or 17, *Microtermes* has from 12 to 14) ; pronotum saddle-shaped.

Minor soldier with ovoid head, more or less narrowed towards posterior ; mandibles slender, only lightly curved, marginal teeth rudimentary or absent ; antennae with 14 or 15 segments.

Worker. There are two worker castes, differing mainly in size ; major workers with head width between 1·4 and 1·6 mm., minor workers between 0·8 and 1·0 mm.

Head yellow with paler clypeus and two distinct brown spots marking the inner articulations of the mandibles ; thorax and abdomen cream, with a sprinkling of short, pale setae. Head rectangular, wider than long to base of mandibles ; clypeus narrow and inflated ; mandibles as in imago ; antennae with 16 segments (sometimes 15) ; pronotum saddle-shaped with rounded anterior lobes separated by a distinct median notch, posterior margin curved or lightly emarginate.

The major workers of *Odontotermes* are larger, the head is longer than broad and the antennae have 17 or 18 segments. In *Microtermes* the worker is smaller, the head is slightly longer than broad and the antennae have 14 segments.

List of species (* indicates that the imago is known).

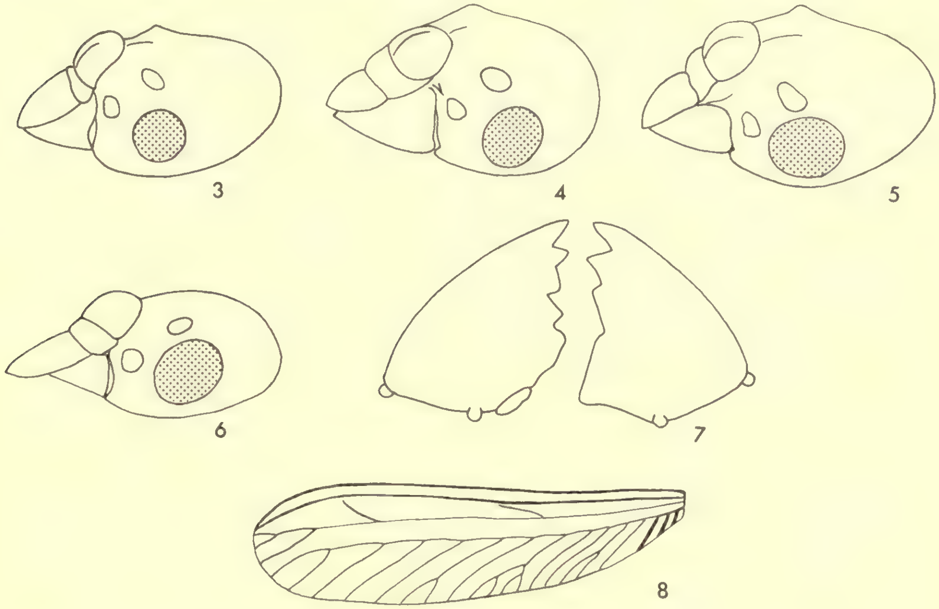
1.	**cavithorax* (Sjöst.)	West Africa
	amphidon Sjöst.	West Africa
2.	**crucifer* (Sjöst.)	West Africa, Congo, Angola
3.	*equatorius* n. sp.	East Africa
4.	*guineensis* (Silv.)	West Africa
5.	**latinotus* (Holmgr.)	Central and East Africa
	lembomboensis Fuller	South Africa
6.	*microdens* n. sp.	East Africa
7.	**periphrasis* Sjöst.	Sudan and Congo
8.	*wasmanni* Snyder & Emerson	Congo

KEY TO *ANCISTROTERMES* IMAGOS

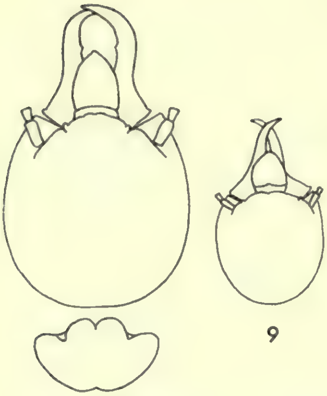
1 Width of head including eyes rarely under 1·77 mm.; hind tibia 1·86 mm. or more; ocelli smaller 2
– Width of head including eyes not more than 1·77 mm.; hind tibia under 1·86 mm.; ocelli large and broadly oval 3
2 Ocelli broadly oval, half the long diameter distant from eyes . . . **latinotus** (p. 15)
– Ocelli narrowly oval, under one-third the long diameter from eyes . **periphrasis** (p. 18)
3 Upper surface of head with numerous strong bristles . . . . . **crucifer** (p. 11)
– Upper surface of head with a few fine bristles . . . . **cavithorax** (p. 9)

KEY TO *ANCISTROTERMES* MAJOR SOLDIERS

1 Left mandible with two microscopic marginal teeth, head and mandibles 1·8–2·0 mm. **wasmanni** (p. 20)
– Left mandible with a single marginal tooth 2
2 Head laterally compressed, narrowed anteriorly, posterior slightly angular, mandibles straight with incurved tips, no basal spur on right mandible, head and mandibles 1·82–2·09 mm. . . . . **guineensis** (p. 14)
– Head oval or ovoid 3
3 Head oval, mandibles robust, each with marginal tooth, right with rudimentary basal spur, head and mandibles 1·82–2·05 mm. . . . . . . **crucifer** (p. 11)
– Head ovoid, right mandible with small marginal tooth and distinct basal spur . . 4



FIGS. 3–6. The Imago head in profile. 3. *latinotus* ; 4. *crucifer* ; 5. *cavithorax* ; 6. *periphrasis*.
FIG. 7. Imago mandibles—*cavithorax*.
FIG. 8. Fore wing—*cavithorax*.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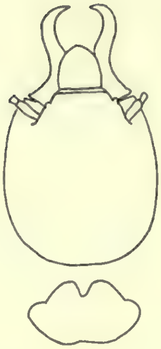
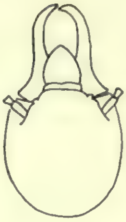
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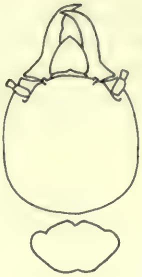
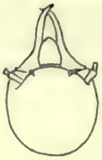
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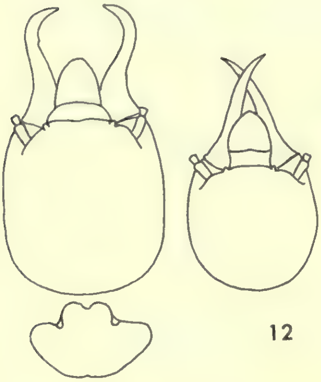
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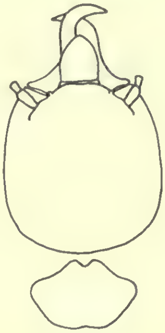
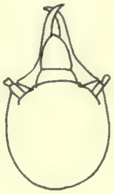
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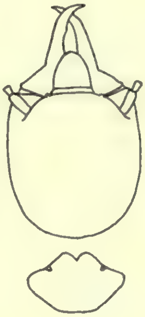
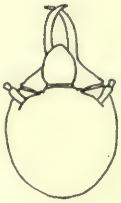
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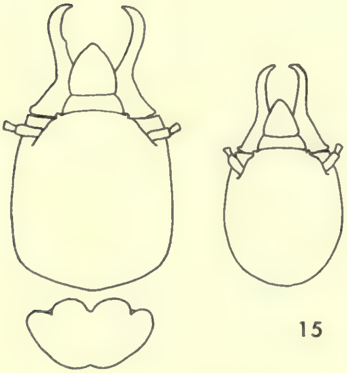
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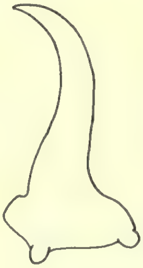
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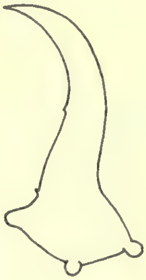
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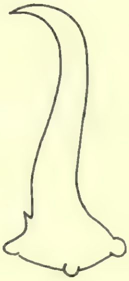
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FIGS. 9–15. Heads of Major and Minor soldiers. 9. *crucifer* ; 10. *microdens* ; 11. *cavithorax* ; 12. *latinotus* ; 13. *periphrasis* ; 14. *equatorius* ; 15. *guineensis*.
FIGS. 16–18. Right mandible of Major soldier. 16. *guineensis* ; 17. *crucifer* ; 18. *latinotus*.

4 Head distinctly narrower at posterior, mandibles lightly curved, head and mandibles 1·68–1·82 mm. **equatorius** (p. 13)
– Head not narrowed towards posterior 5
5 Mandibles curved from base, sides of head lightly curved, head and mandibles 1·50–1·82 mm. **cavithorax** (p. 9)
– Mandibles straight at base, incurving at tips 6
6 Pronotum with deep anterior notch, mandibles with very small marginal teeth, head and mandibles 1·91–2·18 mm. **microdens** (p. 17)
– Pronotum with shallow median notch, mandibles with larger marginal teeth 7
7 Head rectangular-oval, mandibles lightly curved, head and mandibles 1·82–2·27 mm. **latinotus** (p. 15)
– Head ovoid, slightly narrower anterior, mandibles strongly curved, head and mandibles 1·82–1·90 mm. **periphrasis** (p. 18)

Ancistrotermes cavithorax (Sjöstedt)

(Text-figs. 5, 7, 8 and 11)

Termes cavithorax Sjöstedt, 1899, *Ent. Nachr.* **25** : 37 [soldier from Cameroon].
Termes cavithorax Sjöstedt ; Sjöstedt, 1900, *K. Sv. Vetakad. Hand.* **34** : 130–132.
Microtermes cavithorax (Sjöstedt) Holmgren, 1913, *K. Sv. Vetakad. Hand.* **48** : 42.
Termes (Microtermes) cavithorax Sjöstedt Sjöstedt, 1914, *Ark. Zool.* **8** : 4.
Ancistrotermes cavithorax (Sjöstedt) Sjöstedt, 1926, *K. Sv. Vetakad. Hand.* **3** : 163.
Ancistrotermes cavithorax (Sjöstedt) ; Sjöstedt, 1926, *Rev. Zool. Afr.* **14** : 163–164 [imago from Ghana].
Ancistrotermes amphidon Sjöstedt, 1926, *Ent. Tidskr.* **47** : 240–241 [soldier from Ghana]. **syn.n.**
Ancistrotermes cavithorax (Sjöstedt) ; Grassé, 1937, *Ann. Soc. ent. France* **56** : 72–78.

The soldiers of *Ancistrotermes cavithorax* were described briefly by Sjöstedt in 1899 and in greater detail the following year from specimens collected at Victoria, Cameroon. He described the imago from Ghana in 1926, but later ascribed it to a new species, *amphidon*. It is, however, proposed to regard *amphidon* as a synonym employed for one series of *cavithorax* rather larger in size of all castes than the average. The imago of *cavithorax* has also been described in detail by Grassé.

Wasmann (1911) described in detail major and minor soldiers from Sankuru, Congo as those of *Termes cavithorax*, and these have been designated types of a new species *A. wasmanni* by Emerson and Snyder in Snyder (1949).

Measurements :
Imago from Ghana and Nigeria :

	Mean (mm.)	Range (15) (mm.)
Width of head with eyes	1·67	1·59–1·77
Diameter of eye	0·45	0·42–0·52
Diameter of ocellus, long	0·21	0·18–0·24
Diameter of ocellus, short	0·16	0·15–0·18
Ocellus to eye	0·09	0·08–0·10
Width of pronotum	1·53	1·41–1·68
Length of pronotum	0·91	0·91–0·95
Length of hind tibia	1·80	1·72–1·82
Length of fore wing	15·7	15·0–16·0
Width of fore wing	3·9	3·6– 4·5

Soldiers from Ghana and Nigeria :

	Major		Minor	
	Mean (mm.)	Range (mm.)	Mean (mm.)	Range (mm.)
Length of head and mandibles .	1·62	1·50–1·82	1·21	1·14–1·36
Length of head	1·05	0·91–1·18	0·72	0·68–0·77
Width of head	1·00	0·91–1·14	0·73	0·68–0·82
Length of left mandible . .	0·74	0·73–0·78	0·58	0·54–0·64
Width of pronotum . . .	0·70	0·64–0·82	0·52	0·50–0·54
Length of hind tibia . . .	0·95	0·91–1·04	0·80	0·77–0·86

Illustrations. Imago, soldier and worker castes are figured by Grassé (1937) together with photographs of the fungus comb present in the nests. Figure of head and pronotum for major and minor soldiers of *amphidon* are given by Sjöstedt (1926).

Distribution. Type locality—CAMEROON : Victoria, in Mus. Stockholm.

Other material. CAMEROON : Mamfe, 1957 (*W. Wilkinson*).

NIGERIA : Eastern Region—Port Harcourt, Ikot–Ekepene road, Umuahia, Onitsha, Abakaliki–Ikom road, Enugu, 1957 (*W. Wilkinson*) ; Northern Region—Ankpa, Makrudi, Lokoja, Beli, Badeggi, Bida, Jos, Gombe, Kaduna, Zaria, Damaturu, Argungu, Keffi, 1956–58 (*W. A. Sands*) ; Western Region—Agege, 1912 (*A. D. Peacock*) ; Ikeji, 1955 (*W. V. Harris*) ; Ibadan, Oyo, 1958 (*W. A. Sands*) ; Benin, 1957 (*W. Wilkinson*).

GHANA : Accra, 1926 (*A. J. Pomeroy*) ; Aburi, 1926 (*W. H. Patterson*) " *amphidon* Sjöstedt, co-types ". Koforida, 1922 (*Baker*) ; Kumasi, 1955 (*W. V. Harris*) ; Accra, Ejura, Lawra, Wenchi, Volta Bridge, Tamale, Wa, Bolgatanga, 1959 (*W. A. Sands*).

IVORY COAST : Abidjan, 1963 ; Dabou, 1964 (*P. Bodot*).

SIERRA LEONE : Njala, 1955 (*W. V. H.*) ; Freetown, Bo, 1958 (*W. A. S.*)

UGANDA : West Nile, Arua, 1965 (*K. W. Brown*).

Additional published records : CONGO : Sankuru, in Sjöstedt (1926).

IVORY COAST : Aboisso, Akakra, Bouaké, Beoumi, Man in Grassé (1937).

The record of *A. amphidon* from Uganda in Harris (1951) is referred to below under *equatorius* n. sp.

Biology. *A. cavithorax* is found throughout West Africa in clearings within the coastal forests, in the mixed woodland savanna, and to the northern limits of the Guinean woodland.

The subterranean nest is a system of oval chambers, many containing fungus comb, connected by galleries of varying length. Grassé describes a nest made of earth situated inside the hollow trunk of a Borassus palm, with chambers measuring 5–6 cm. in length and 3–4 cm. high. Many nests are recorded from mounds of *Macrotermes*, *Trinervitermes*, *Cubitermes* and *Thoracotermes*.

Foraging workers seek out dead wood for food, usually fallen logs and timber in contact with the ground. Covered runways are built with soil up the trunks of trees and suitable feeding areas of dead bark are covered with sheets of earth. Young trees are frequently killed as a result of ring-barking by this termite, especially in afforestation projects with Eucalyptus. The woodwork of buildings is also subject to attack.

Swarming is recorded between 18.30 and 18.45 hours at Aboisso in the southern Ivory Coast during the month of February (Grassé).

Ancistrotermes crucifer (Sjöstedt)

(Text-figs. 4, 9 and 17)

Termes crucifer Sjöstedt, 1897, *Ent. Tidskr.* **18** : 123 [imago from Sierra Leone and Cameroon].
Termes crucifer Sjöstedt ; Sjöstedt, 1900, *K. Sv. Vetakad. Handl.* **34** : 127–130.
Termes (*Ancistrotermes*) *crucifer* Sjöstedt ; Silvestri, 1912, *Ann. Mus. Napoli* **3** : 4–5.
Microtermes crucifer (Sjöstedt) Holmgren, 1912, *K. Sv. Vetakad. Handl.* **48** : 42.
Ancistrotermes crucifer (Sjöstedt) Silvestri, 1914, *Boll. Lab. zool. Portici* **9** : 18.
Ancistrotermes crucifer (Sjöstedt) ; Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* **3** : 162–163.
Ancistrotermes crucifer (Sjöstedt) ; Emerson, 1928, *Bull. Amer. Mus. nat. Hist.* **57** : 468–469.
Ancistrotermes crucifer (Sjöstedt) ; Grassé, 1937, *Ann. Soc. ent. France* **106** : 70–72.
Ancistrotermes crucifer (Sjöstedt) ; Weidner, 1956, *Pub. cult. Comp. Diamantes Angola* **29** : 86–87.
Ancistrotermes crucifer (Sjöstedt) ; Harris, 1958, *Explor. Parc nat. Upemba* **52** : 21.
Ancistrotermes crucifer (Sjöstedt) ; Harris, 1963, *Explor. Parc nat. Garamba* **42** : 31.

The preliminary description of *Termes crucifer* from Sierra Leone and Cameroon was based by Sjöstedt (1897) on the winged imago. This was followed in 1900 by detailed descriptions of all castes " nach den Typen ", but the list of material studied indicates soldiers and workers only from Malanga in Angola. This locality is given by Silvestri (1914) as the source of *Ancistrotermes latinotus*, with the result that the first account of *crucifer* soldiers from West Africa is to be found in that paper. The two soldier castes are re-described by Emerson (1928) from north-east Congo, while measurements and figures of Ivory Coast specimens are in Grassé (1937).

Measurements :
Imago :

		West Africa and Congo	
	" Cotypes ", Abo (2) (mm.)	Mean (mm.)	Range (9) (mm.)
Width of head with eyes	1·68–1·77	1·71	1·68–1·77
Diameter of eye	0·45–0·54	0·48	0·45–0·54
Diameter of ocellus, long	0·25–0·27	0·22	0·21–0·23
Diameter of ocellus, short	0·18	0·15	0·14–0·18
Ocellus to eye	0·08–0·09	0·09	0·09–0·10
Width of pronotum	1·50–1·54	1·55	1·46–1·68
Length of pronotum	0·91	0·92	0·82–1·00
Length of hind tibia	1·72–1·77	1·82	1·72–1·86
Length of fore wing	15–16	15·7	15·0–16·0
Width of fore wing	3·7–4·0	3·9	3·6–4·1

Soldiers :

	Major		Minor	
	Mean (mm.)	Range (17) (mm.)	Mean (mm.)	Range (4) (mm.)
Length of head and mandibles	1·91	1·82–2·05	1·37	1·23–1·46
Length of head	1·23	1·09–1·28	0·80	0·68–0·86
Width of head	1·18	1·09–1·28	0·80	0·77–0·86
Length of left mandible	0·82	0·77–0·86	0·69	0·64–0·77
Width of pronotum	0·80	0·77–0·86	0·59	0·54–0·64
Length of hind tibia	1·08	0·86–1·09	0·86	0·82–0·91

Illustrations. The imago head is figured by Silvestri (1914). The head and thorax of the major soldier appears in Silvestri, Emerson (1928), Grassé (1937) and Weidner (1956). Grassé illustrates the whole minor soldier.

Distribution. Type locality—Sierra Leone and Cameroon (Abo and Mungo)—imago.

Material examined. CAMEROON : Abo (*Buchholz*) in Naturhistoriska Riksmuseum, Stockholm.

GAMBIA : Bunaka Kunda, Busumbula, 1956 (*C. R. Wallace*).

SIERRA LEONE : Jarama, 1948 (*F. A. Squire*) ; Njala, 1955 (*W. V. Harris*).

IVORY COAST : Abidjan, 1964 (*C. Noirot*) ; Dabou, 1964 (*P. Bodot*).

GHANA : Aburi, Kumasi, 1925 (*W. H. Patterson*) ; Accra, 1955 (*W. V. Harris*).

NIGERIA : Northern Region—Sokoto, Zaria, Kaduna, Gombe, Jos, Yola, Bida, Zinna, Kabba, Gboko ; Western Region—Ilorin-Oyo road, Ibadan, 1956–58 (*W. A. Sands*) ; Eastern Region—Onitsha, 1957 (*W. Wilkinson*).

CONGO : Garamba National Park, 1950–52 (*H. De Seager*) ; Upemba National Park, 1947 (*G. F. de Witte*).

Additional published records. SENEGAL : Dakar, in Sjöstedt (1926).

IVORY COAST : Man, Dimboko, in Grassé (1937).

TOGO : Misahohe, Bismarckburg, in Sjöstedt (1900).

CONGO : Niangara, Yakulu, in Emerson (1928).

ANGOLA : Dundo, in Weidner (1956).

Biology. *Ancistrotermes crucifer* occurs throughout the savanna and woodland areas of West Africa and the Congo down to the northern limits of *Brachystegia* woodland in Angola. The subterranean nest system is composed of approximately spherical chambers, some 2 inches in diameter, connected by galleries. These chambers contain fungus combs. Nests are also to be found in the walls of mounds constructed by other termites, for example those of *Macrotermes*, *Cubitermes*, *Thoracotermes* and *Trinervitermes* in Ghana and Nigeria.

The workers build covered runways on dead tree stumps and on the trunks of living trees in search of dead wood. Damage to economic crops is common, particularly to groundnuts and young Eucalyptus trees. In Ghana young saplings of *Gmelina* and teak have been attacked.

Winged adults are recorded as swarming at Dundo, Angola at 18.00 hours in the month of August, and in the Upemba National Park in south-east Congo during October.

Ancistrotermes equatorius sp. n.

(Text-fig. 14)

Imago. Unknown.

Soldiers. Major soldier ; head yellow, not noticeably setose ; mandibles brown ; antennae ivory. Thorax, abdomen and legs ivory.

Head as long as broad, distinctly narrowed towards the posterior, sides curved ; labrum rather longer than broad, obtusely pointed ; mandibles robust, the distal halves strongly incurved, left mandible with small tooth midway on inner margin ; gulamentum broad, narrowed towards the anterior, strongly convex in section ; antennae with 15 segments, III small, IV, V and VI equal.

Pronotum with anterior lobes small and pointed, separated by an acute angled notch ; posterior margin flatly curved.

Minor soldier ; head pale yellow, mandibles light brown. Thorax and abdomen ivory.

Head ovoid, sides converging towards the posterior ; labrum conical ; mandibles slender, tapering, lightly curved at the tips ; antennae with 15 segments, III very short ; gulamentum short and broad, convex in cross-section.

Pronotum with short anterior lobes divided by a shallow, obtuse angled median notch.

Measurements :	Major soldier		Minor soldier	
	Mean (mm.)	Range (10) (mm.)	Mean (mm.)	Range (8) (mm.)
Length of head and mandibles .	1·75	1·68–1·82	1·32	1·28–1·36
Length of head	1·10	1·00–1·14	0·75	0·73–0·82
Width of head	1·04	1·00–1·09	0·77	0·73–0·82
Length of left mandible . .	0·79	0·76–0·82	0·65	0·59–0·68
Width of pronotum	0·73	0·68–0·77	0·56	0·54–0·59
Length of hind tibia . . .	1·02	0·95–1·09	0·85	0·77–0·91

The major soldier is distinguished from other *Ancistrotermes* by the shape of the head, which is narrowed towards the posterior. It differs from *latinotus* in possessing mandibles more robust and curved, and from *amphidon* in having a blunter tooth on the left mandible and a deeper, more angular notch on the anterior margin of the pronotum.

The minor soldier closely resembles that of *cavithorax*.

Holotype, major soldier, UGANDA : Karamoja district, 40 miles south-west of Moroto, 12.x.52 (*W. A. Sands*), in British Museum (Nat. Hist.)

Further records. UGANDA : Karamoja district, Toro Hills, 8.x.52 (*W. A. Sands*) ; Kitgum, attacking cotton, 22.ix.37 (*A. M. Gwynn*) ; Busia, inside mound of *Cubitermes*, 21.i.50 (*W. V. Harris*) ; Soroti, inside *Cubitermes* mound, 13.x.52 (*W. A. Sands*).

Described from 20 major soldiers, 14 minor soldiers and a number of workers from five localities in northern and eastern Uganda.

Ancistrotermes guineensis (Silvestri)

(Text-figs. 15 and 16)

Termes (*Ancistrotermes*) *crucifer* subsp. *guineensis* Silvestri, 1912, *Ann. Mus. Civ. Stor. Nat. Genova* (3) **5** : 227 [Port. Guinea].

Microtermes guineensis (Silvestri) Holmgren, 1913, *Ent. Tidskr.* **34** : 333.

Ancistrotermes crucifer var. *guineensis* (Silvestri) Silvestri, 1914, *Bol. Lab. zool. Portici* **9** : 20–21.

Ancistrotermes crucifer var. *guineensis* (Silvestri) ; Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* (3) **3** : 163.

Ancistrotermes guineensis (Silvestri) ; Grassé, 1937, *Ann. Soc. ent. France* **106** : 68–70.

Soldiers and workers from Portuguese Guinea were described by Silvestri as a subspecies of *Ancistrotermes crucifer* (Sjöst.). This was raised to specific rank by Grassé. Silvestri comments that in relation to *crucifer* " subspecies haec a forma typica mandibularum militis majoris brevitate bene distincta est ", while Grassé points out that the major soldier head is more rectangular, and the mandibles more strongly curved at the tips.

Measurements :

	Major soldier		Minor soldier	
	Mean (mm.)	Range (10) (mm.)	Mean (mm.)	Range (5) (mm.)
Length of head and madibles .	1·93	1·82–2·09	1·52	1·50–1·54
Length of head	1·26	1·18–1·36	0·91	0·91
Width of head	1·15	1·14–1·23	0·84	0·82–0·86
Length of left mandible . .	0·77	0·68–0·82	0·73	0·68–0·77
Width of pronotum	0·87	0·82–0·91	0·67	0·64–0·68
Length of hind tibia . . .	1·07	1·00–1·14	0·90	0·86–0·91

These measurements are of soldiers collected in Ghana and Nigeria and are somewhat smaller than the figures given for Portuguese Guinea and for Ivory Coast (width of head 1·26 mm.).

Illustrations. The heads of major and minor soldiers are figured in Silvestri (1912) and Grassé (1937).

Distribution. Type locality—PORTUGUESE GUINEA : Rio Cassine, in Silvestri (1912).

Material examined. GHANA : Accra, 1926 (*A. J. W. Pomeroy*) ; Accra, 1959 (*W. A. Sands*).

NIGERIA : Northern Region—Ayangba, Beli, Bauchi, Kaduna, Portiskum–Kano Road, Minna, Riom, 1956–58 (*W. A. Sands*) ; Western Region—Olokemeje, 1957 (*W. A. Sands*) ; Eastern Region—Port Harcourt–Owerri Road, 1957 (*W. A. Sands*).

CAMEROON : Mamfe, 1857 (*W. Wilkinson*).

Additional published records. GUINEA : Mamou in Silvestri (1914).

IVORY COAST : Akakro in Grassé (1937).

Biology. *A. guineensis* occurs in the Guinean woodland formation along the whole of West Africa, in the more open grass areas and in the dense gallery forest, and in the coastal savanna-forest mosaic. Soldiers and workers are found mainly on dead wood, but in some cases nests have been located beneath the mounds of other termites.

Ancistrotermes latinotus (Holmgren)

(Text-figs. 3, 12 and 18)

Microtermes latinotus Holmgren, 1912, *K. Sv. Vetakad. Handl.* **48** (4) : 42 [soldier from Luapula, S.W. Congo].

Microtermes latinotus Holmgren ; Holmgren, 1913, *Ent. Tidskr.* **34** : 332 [imago].

Ancistrotermes latinotus (Holmgren) Silvestri, 1914, *Bol. Lab. Zool. Scuol. Sup. Agr. Portici* **9** : 19.

Ancistrotermes lembomboensis Fuller, 1922, *S. Afr. J. nat. Hist.* **3** : 103. **syn. n.**

Ancistrotermes latinotus (Holmgren) ; Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* **3** : 161.

Ancistrotermes latinotus (Holmgren) ; Harris, 1948, *Proc. R. ent. Soc. Lond.* (B) **17** : 80.

Ancistrotermes latinotus (Holmgren) ; Grassé & Heim, 1950, *Rev. sci. Paris* **88** : 3–13.

Ancistrotermes latinotus (Holmgren) ; Weidner, 1956, *Pub. cult. Comp. Diamantes Angola* **29** : 86.

Holmgren (1912) lists under the genus *Microtermes* as a new species *M. latinotus* from Luapula with the remark " The figures of a soldier *Termes crucifer* which Silvestri gives (1912, *Ann. Mus. Zool. Napoli* **3** : 4–5) does not agree with the type of this species at all and belongs most likely to a new species which I designate *Microtermes latinotus* n. sp." In the following year this species is included by Holmgren in his keys to the African *Microtermes*, the imago being mentioned for the first time, being separated from *crucifer* by the larger ocelli and indistinct fontanelle, while the soldier is said to differ from *crucifer*, *cavithorax* and *guineensis* by a pronotum much broader than the head. This last is incorrect, being derived from an error in Silvestri's illustration of his Luapula soldier.

Silvestri (1914) provides the first descriptions and correct figures of *A. latinotus*. He makes no reference to Holmgren's locality and gives as habitat Angola : Malanga. This refers to specimens of imagos and soldiers from Angola which Sjöstedt had listed in his Monographie (1900) under *Termes crucifer*.

Sjöstedt (1926) considers that the correct attribution of *latinotus* is to Silvestri. To remove *latinotus* Holmgren as a *nomen nudum* would render the name inadmissible for further use in the genus. This would be undesirable from a practical standpoint, but it is doubtful if the question does, in fact arise.

Fuller's *Ancistrotermes lembomboensis* (1922) from Swaziland, Transvaal and Mozambique is a synonym which appears to have arisen from an incorrect appreciation of Silvestri's measurements of the imago ocellus.

Measurements :

Imago :

	Angola, Malanga		Zambia and Tanganyika	
	Male (mm.)	Female (mm.)	Mean (mm.)	Range (16) (mm.)
Width of head with eyes	1·82	1·82	1·82	1·72–1·86
Diameter of eye	0·45	0·45	0·45	0·41–0·50
Diameter of ocellus, long	0·18	0·23	0·21	0·18–0·27
Diameter of ocellus, short	0·13	0·13	0·14	0·13–0·16
Ocellus to eye	0·13	0·13	0·13	0·09–0·18
Width of pronotum	1·64	1·68	1·72	1·60–1·84
Length of pronotum	1·02	1·09	1·02	0·82–1·14
Length of hind tibia	1·86	1·86	1·95	1·86–2·00
Length of fore wing	18·0	18·0	17·7	16·0–20·0
Width of fore wing	4·0	4·0	4·3	3·8–4·8

Soldiers. Rhodesia to Tanganyika :

	Major		Minor	
	Mean (mm.)	Range (25) (mm.)	Mean (mm.)	Range (10) (mm.)
Length of head and mandibles	2·06	1·82–2·27	1·79	1·68–1·90
Length of head	1·24	1·09–1·41	0·97	0·86–1·94
Width of head	1·17	1·00–1·36	0·95	0·77–1·06
Length of left mandible	0·87	0·82–0·95	0·83	0·77–0·90
Width of pronotum	0·83	0·73–1·00	0·67	0·59–0·73
Length of hind tibia	1·07	1·00–1·14	0·90	0·82–1·00

Illustrations. The imago head and the head and thorax of the major soldier are figured in Silvestri (1914). Sjöstedt (1926) has a small figure of the minor soldier head.

Distribution. Type locality—South-east CONGO : Luapula (*Duchessa d'Aosta*).

Material examined. ANGOLA : Malanga (*Mechow*) in Naturhistoriska Riksmuseum, Stockholm.

ZAMBIA : N'changa, 1931 (*C. T. Macnamara*) ; Samfya, nr. Lake Bangweulu, Fort Roseberry, Kitwe, Ndola, Choma, Kafue Bridge, 1957 (*W. G. H. Coaton*) ; nr. Tunduma, 1953 (*Sands & Wilkinson*).

RHODESIA : Chipinga District, 1939 (*A. Cuthbertson*) ; Trelawney, 1949 (*G. H. Bunzli*) ; Gokwe, 1962 (*M. G. Bingham*).

MALAWI : Mlange, 1932 (*C. Smee*) ; Karonga, Bua River, Kasungu, Fort Johnstone, Zomba, Lower Shire River, Domasi, 1953 (*Sands & Wilkinson*) ; Lilongwe, 1959 (*W. V. Harris*).

SWAZILAND : Lebombo Flats, 1916 (*C. Fuller*—" cotypes " of *lembomboensis*).

SOUTH AFRICA : Messina, 1916 (*C. Fuller*).

TANGANYIKA : Uvinza, 1934 ; Kigoma, 1934 ; Shinyanga, 1934 ; Muheza, 1934 ; Tabora, 1935 ; Songea, 1935 ; Kasulu, 1935 ; Tabora, 1935 ; Morogoro, 1937 ; Lindi, 1938 ; Uzinza, 1938 ; Usangu, 1939 (*W. V. Harris*) ; Handeni, Daluni, Ngomeni, 1951, Mkomasi, Mwakijembe, Gombelo, 1952 (*P. B. Kemp*) ; Nachingwea (*M. Bigger*).

KENYA : Kinango, 1952 (*P. B. Kemp*) ; Ngombeni and Lukongo near Mombasa, 1952 (*W. A. Sands*).

Additional published records. CONGO : Libenge, in Sjöstedt (1926).

CENTRAL AFRICAN REPUBLIC : Bossembelé, in Grassé & Heim (1950).

MOZAMBIQUE : Xinavane nr. Lourenço Marques, in Fuller (1922).

The specimens labelled " Sudafrika, Periguey col." in the Stockholm collection have a further label " Kap? Rhodesia? ".

Biology. *A. latinotus* occurs mainly to the south of the equator, and in association with the *Brachystegia–Isoberlinia* woodlands or " miombo ". In north-east Tanganyika and adjacent Kenya, where the vegetation is in general the drier *Acacia-Commiphora* thicket, *A. latinotus* is found in isolated patches of miombo on higher ground.

The nest system is a loose agglomeration of interconnected chambers, roughly spherical and from 2 to 3 inches in diameter. These chambers contain fungus combs of a typically convoluted form. Nests have been located by trenching, or during terracing operations on sloping ground. They have also been found in the outer walls of mounds constructed in woodland by *Macrotermes* and *Pseudacanthotermes*, and in open grasslands within the miombo by *Cubitermes*, *Crenitermes* and *Trinervitermes*.

Workers feed on fallen logs and branches, and construct covered runways on the trunks of trees in search of dead wood. They are attracted to wooden pegs, fence posts, etc. They have been recorded attacking Eucalyptus seedlings, tea bushes and cotton.

The soldiers have a vague odour, likened by one observer to that of the grass *Cymbopogon*.

Swarming has been observed at various times between 15.00 hours and sunset, but mainly between 17.00 and 18.00 hours, during the rainy season (October to April in eastern Tanganyika). The appearance of winged adults is not restricted to periods of overcast sky.

***Ancistrotermes microdens* sp. n.**

(Text-fig. 10)

Imago. Unknown.

Soldiers. Major soldier ; head broadly oval with flatly curved posterior ; labrum large, as wide as long, with obtuse tip ; mandibles robust, basally straight, then curving strongly towards the tip, each mandible with a single median marginal tooth, the right mandible with a short basal spur ; antennae 14–15 segments, depending on the separation of a short III from IV.

Pronotum with small, pointed anterior lobes separated by a deep notch ; posterior margin lightly sinuate.

Minor soldier ; head ovoid, narrower at the posterior ; labrum large, pointed ; mandibles slender, straight with in-curved tips, marginal teeth inconspicuous ; antennae 15 segments, III very short.

Pronotum with short, rounded anterior lobes separated by a rounded notch ; posterior margin almost straight.

Measurements :

	Major soldiers		Minor soldiers	
	Mean (mm.)	Range (mm.)	Mean (mm.)	Range (mm.)
Length of head and mandibles .	1·99	1·91–2·18	1·63	1·54–1·72
Length of head	1·26	1·18–1·41	0·92	0·86–1·00
Width of head	1·15	1·09–1·25	0·91	0·86–0·91
Length of left mandible . .	0·78	0·73–0·82	0·79	0·77–0·82
Width of pronotum . . .	0·88	0·82–0·95	0·71	0·68–0·77
Length of hind tibia . . .	1·05	1·00–1·14	0·92	0·91–0·95

The major soldier agrees with the published description of *A. wasmanni* apart from the " two very small teeth in the middle of the left mandible ". It differs from *latinotus* in the reduced marginal tooth on the left mandible and the considerably deeper anterior marginal notch of the pronotum. *A. cavithorax* has a more rounded head, and *periphrasis* has more strongly in-curved mandibles.

The minor soldier is larger than *periphrasis*, with the head proportionately longer. Compared with *latinotus* the mandibles are more strongly curved, the head narrower at the posterior, and the pronotum distinctly wider.

Holotype, major soldier, KENYA : Kisumu, on lake shore in upper levels of *Macrotermes* mound, 18.iv.52 (*W. A. Sands*), in British Museum (Nat. Hist.).

Paratypes, major and minor soldiers from type colony ; KENYA : West Suk, 4.x.52. UGANDA : Toror Hills, Karamoja District, 8.x.52 ; Moroto, river valley, 7.x.52 ; Moroto, 5.x.52 (*W. A. Sands*).

Described from major and minor soldiers in six series from western Kenya and adjacent Karamoja District of Uganda.

Ancistrotermes periphrasis Sjöstedt

(Text-figs. 6 and 13)

Ancistrotermes periphrasis Sjöstedt, 1924, *Rev. Zool. Afr.* **12** : 496 [minor soldier from the Sudan].

Ancistrotermes periphrasis Sjöstedt ; Sjöstedt, 1926, *Rev. Zool. Afr.* **14** : 149–150 [imago from Congo].

Ancistrotermes periphrasis Sjöstedt ; Sjöstedt, 1926, *Ent. Tidskr.* **47** : 241–242 [major soldier from Ghana].

This species was established by Sjöstedt for soldiers collected in Kordofan Province, Sudan. Later the imago was described from the Upper Uelé area of the Congo, in association with similar soldiers. In the same year specimens of two soldier castes from Ghana were considered to represent the minor soldier, as already described, and the hitherto unknown major soldier. Only the minor soldier has been figured.

Additional material from Kordofan has now become available, consisting of six series of both major and minor soldiers. The minor soldiers are similar to the holotype of Sjöstedt. The opportunity is taken to add to the original descriptions. It has not been possible to examine the major soldier from Ghana, but the minor soldier is sufficiently different from the Sudan specimens as to caste doubt on this record.

Imago. " Close to *latinotus*, from which it differs slightly but significantly in size, is darker in colour, and possesses cross veins in the sub-costal area of the wing which are absent in *latinotus*. The ocelli are much closer to the eyes than in *latinotus* ".

Other characters mentioned by Sjöstedt are : head oval, dark brown with pale yellow, fairly large clypeus ; eyes quite circular ; ocelli oval, the ratio of the long and short diameters being 8 : 5, the distance between ocellus and eye equal to one quarter of the long diameter ; antennae with 17 segments ; pronotum with a deep median anterior notch, and posterior margin lightly indented ; wings with oblique cross veins in the subcostal area.

Measurements of three morphotypes from Iri, Upper Uelé :

	(mm.)
Width of head with eyes	1·86
Diameter of eye	0·54
Diameter of ocellus, long	0·25
Diameter of ocellus, short	0·15–0·18
Ocellus to eye	0·06–0·08
Width of pronotum	1·64–1·72
Length of pronotum	1·00–1·09
Length of hind tibia	1·86–1·96
Length of fore wing	20
Width of fore wing	4·6

Soldiers. Major soldier ; head orange-yellow, mandibles dark brown, antennae pale yellow. Pronotum, abdomen and legs pale yellow, with numerous pale yellow bristles.

Head broadly rectangular, with sides and posterior curved ; labrum short and broad with obtuse tip ; mandibles strongly in-curved at the tip, left mandible with a small median tooth, below which the margin is straight until a small notch separates it from the large basal process ; right mandible without a median tooth, but basal spur present ; antennae with 15 segments, III small, IV and V equal and shorter than II ; gulamentum broad with lightly curved sides, strongly convex in cross-section.

Pronotum with small, pointed anterior lobes and emarginate posterior.

Minor soldier ; head yellow, mandibles brown, antennae pale yellow. Pronotum, abdomen and legs pale yellow with inconspicuous short, pale bristles.

Head oval ; labrum large with obtuse tip ; mandibles long and slender with slightly in-curved tips and smooth inner margins ; antennae with 14–15 segments.

Anterior lobes of pronotum not so acutely pointed as in major soldier, posterior straight.

Measurements :

	Major range (mm.)	Minor range (mm.)
Length of head and mandibles	1·82–1·90	1·36–1·41
Length of head	1·23–1·32	0·77–0·82
Width of head	1·11–1·18	0·77
Length of left mandible	0·77–0·86	0·68
Width of pronotum	0·73–0·86	0·59
Length of hind tibia	1·04–1·09	0·82–0·86

The major soldier differs from *guineensis* in having a rounded posterior margin to the head, and in lacking the rounded anterior lobes of that species. The marginal tooth of the left mandible is smaller.

Sjöstedt describes the minor soldier as being " nearest to *cavithorax*, but with more strongly in-curved mandibles ".

Illustrations. The head and pronotum of the minor soldier are figured by Sjöstedt in his Revision (1926).

Distribution. Type locality—SUDAN : Kordofan Prov., El Amira-Bir Joghan (*R. Ebner*), minor soldier and worker, Sjöstedt No. 507 in Mus. Stockholm. Morphotype imagos—CONGO : Uelé Prov., Iri, èclosion dans la pluie, 5 hrs. 21.iv.25 (*H. Schouteden*), Sjöstedt No. 517a in Mus. Stockholm, and in Mus. Tervuren, associated with minor soldiers.

Additional material. SUDAN : Kordofan Prov. Kadugli, vii.52 ; Kadugli–Talodi road, attacked by *Pheidole* ants, vi.52 ; El Berdab, attacking cotton plants, xi.52 ; Jebel Debri, ix.52 ; Lamma, x.52 ; Lake Keilad, vi.52 ; Jebel Miri, vi.52 (*C. Sweeney*).

Ancistrotermes wasmanni Snyder & Emerson

Termes cavithorax Sjöstedt ; Wasmann, 1911, *Rev. Zool. Afr.* **1** : 102 [soldiers from Congo].
Ancistrotermes cavithorax (Sjöstedt) Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* (3) **3** : 163 [locality].
Ancistrotermes wasmanni Snyder & Emerson in Snyder, 1949, *Smithson. Misc. Coll.* **112** : 247.

A series of soldiers and workers from the Congo was identified by Wasmann as *Termes cavithorax*, with the comment that they agreed with Sjöstedt's description apart from the mandibles of the major soldier being " strongly bent and sharp pointed, the right one without teeth, the left with two very small teeth in the middle, the hind one only visible under magnification ". Sjöstedt includes this locality in his account of *Ancistrotermes cavithorax* in his Revision.

Snyder & Emerson consider the series to represent a new species, to which they give the name *wasmanni*, without further discussion, in Snyder's Catalog.

It has not been possible to examine Wasmann's specimens in this study.

Measurements. Wasmann gives the following measurement :

	Major soldiers (mm.)	Minor soldiers (mm.)
Total length	4·0–4·3	2·5–3·6
Length of head and mandibles	1·8–2·0	1·2–1·6

Illustrations. None.

Type locality. CONGO : Sankuru, in Wasmann (1911).

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BRITISH MUSEUM
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REVISIONAL NOTES ON THE GENUS *ANTANARTIA* (LEPIDOPTERA : NYMPHALIDAE)

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Pp. 21–43 ; 21 *Text-figures,* 5 *Plates*

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CONTENTS

	Page
INTRODUCTION	23
KEY TO SPECIES, SUBSPECIES AND FORMS	25
DESCRIPTIONS	26
ABNORMAL SCALING	36
PARALLEL MODIFICATION	37
ACKNOWLEDGEMENTS	38
REFERENCES	38

SYNOPSIS

In the present paper one new species, consisting of four subspecies, is described together with four new subspecies and a possible interspecific hybrid. One name has been synonymized and attention is also drawn to the existence of two clines. All the known species and subspecies are figured together with figures of the male and female genitalia, and a key to the species, subspecies and forms is given. Notes on scale defects and parallel modification are also given.

INTRODUCTION

THE genus *Antanartia* Rothschild & Jordan (1903 : 508) (Type : *delius* Drury) was erected to include the five African, Malagasy and Mascarene species which were originally placed in *Hypanartia* Hübner, which now contains only New World species. The species of *Antanartia* inhabit Africa from Sierra Leone through the West Coast to Ethiopia, southwards to Cape Province and then eastwards to the Comoro Islands, Madagascar and the islands of Réunion and Mauritius. In the tropics most of the species are montane in habit, preferring altitudes of between 3,000 and 13,000 feet.

The present investigation was begun when some material was sent to the Department of Entomology, British Museum (Natural History) for determination and it was realized that there were several previously unrecognized subspecies present amongst the museum material. In the course of this investigation all the characters mentioned by Rothschild & Jordan were examined with a view to placing the species in a more natural phylogenetic order than that given by Aurivillius (in Seitz, 1913).

When Rothschild & Jordan separated *Antanartia* from *Hypanartia* one of the characters they mentioned was the presence, in the male of *Hypanartia*, of a mesial hook on the eighth abdominal tergite. This structure, named the superuncus by Kusnezov in 1915, is unusual in Rhopalocera but it is extremely well developed in

Hypanartia. In *Antanartia* there are several characters present that are not in the American genus. In *Antanartia,* the uncus is slightly bifurcate, but not deeply channeled as in *Hypanartia* and the brachia below it are well developed. The valvae are unusual in that they possess an inner and outer harpe, the latter, arising basad of the outer margin, is a massive structure strongly armoured with large teeth and spines. It is held in position by an outer flange of the cucullus and a lobe or lobes along the costal or dorsal edge of the valva. The flange and lobes have numerous strong setae which help to retain the harpe in position. In one species, *abyssinica* (Felder), the outer harpe is Y-shaped with the apex widely bifurcated. In some cases the aedeagus has two barbs ventrally towards the tip and in others these are absent. The saccus is reduced or absent and the vinculum is produced ventrally and posteriorly so that the whole genitalia lie well within the body cavity when at rest.

The female genitalia are unusual in that they have the sterigma or intersegmental membranes of the abdominal sternites adjacent to the ostium heavily chitinized and in the form of pouches. It seems probable that these have been developed to prevent the accidental rupture of the abdominal wall by the heavily armoured harpes of the male during copulation.

In both sexes the genitalia can be divided into two groups of three species, those that have the barbed aedeagus in the male together with those without the signa on the ostium bursa of the female, namely *delius* (Drury), *schaeneia* (Trimen) and *borbonica* (Oberthür), and those that have an unbarbed aedeagus in the male and a well-developed signa in the female, namely *hippomene* (Hübner), the newly described *dimorphica* and *abyssinica* (Felder).

Rothschild & Jordan when dealing with *dimorphica* sp. n. (as *hippomene* Hübner), *schaeneia* (Trimen) and *abyssinica* (Felder) drew attention to the variation in the small area of modified scales situated on the underside of the fore wing near the base of space 1a in both sexes. This character, like the genitalic characters mentioned above, tends to illustrate the same specific relationships so that the six species divide into two, the *delius* group and the *hippomene* group of species. In the first the specialized scale area is confined to space 1a by the vein 1a but in the second it extends beyond the vein into space 1b above it, though *abyssinica* (Felder), being more variable, tends to link the two groups.

The critical areas of the venation in the genus are situated in the apical area of the discoidal cell of the fore wing and in the area of veins 3 and 4 of the hind wing and these have been figured for each species. Further remarks on the aberrant nature of the venation of *Antanartia borbonica* (Oberthür) may be found under that species (p. 30).

All the type material is in the British Museum (Natural History) except where otherwise stated.

In the descriptions the length of the fore wing is measured from the base to the apex and where two measurements are given, these denote the smallest and largest specimens in the series. In order to save unnecessary repetition when there is a long series of paratypes only the more important data i.e., the locality, altitude and date are given with an overall figure for the country concerned.

Key to the Species, Subspecies and Forms of *ANTANARTIA*, Based on the Wing Markings

1		Upperside fore wing with no clearly defined yellow/red transverse band from mid-costa to near tornus	2
–		Upperside fore wing with clearly defined transverse band	5
2	(1)	Upperside hind wing pale discal area not suffused with dark red or brown	3
–		Upperside hind wing pale discal area suffused with dark red or brown	4
3	(2)	Upperside fore wing cell not darkened beyond central bar	**delius delius** (p. 26)
–		Upperside fore wing cell darkened beyond central bar	**delius delius** f. **nigrescens** (p. 27)
4	(2)	Underside fore wing transverse area pale	**delius guineensis** (p. 27)
–		Underside fore wing transverse area dark, red-brown or brown	**delius delius** f. **amauroptera** (p. 27)
5	(1)	Hing wing with no tail at vein 4	6
–		Hind wing with tail at vein 4	8
6	(5)	Upperside fore wing cell bar broken and darker than base	**abyssinica vansomereni** (p. 31)
–		Upperside fore wing cell bar not broken and not darker than base	7
7	(8)	Upperside hind wing ocellus in space 2 smaller than those in 3 and 4, often blind, marginal band abruptly broader in space 5	**abyssinica abyssinica** (p. 31)
–		Upperside hind wing ocelli in spaces 2–4 more equal, that in 2 with pupil, marginal band gradually widened in space 5	**abyssinica jacksoni** (p. 31)
8	(5)	Upperside hind wing with well defined post discal black line	9
–		Upperside hind wing without post discal line	11
9	(8)	Upperside hind wing band narrow and divided by dark interneural lines, ♀ upperside fore wing transverse band cream	**schaeneia diluta** (p. 29)
—		Upperside hind wing band wider and interneural lines inconspicuous, ♀ upperside fore wing transverse band not cream	10
10	(9)	Underside fore wing inner edge of transverse band stepped at vein 2 and not at vein 1	**schaeneia schaeneia** (p. 28)
—		Underside fore wing inner edge of transverse band not stepped at vein 2 but stepped at vein 1	**schaeneia dubia** (p. 29)
11	(8)	Underside fore wing with broad violet submarginal line from vein 6 to tornus	12
—		Underside fore wing without violet submarginal line	13
12	(11)	Upperside fore wing post discal spots in spaces 5 and 6 white	**borbonica borbonica** (p. 30)
—		Upperside fore wing post discal spots in spaces 5 and 6 suffused with orange	**borbonica mauritiana** (p. 30)
13	(11)	Underside fore wing basal cell markings outlined in bluish white or cream	14
—		Underside fore wing basal cell markings outlined in brown or red	15
14	(13)	Hind wing tail at vein 4 short (± 3 mm.) and broad. Upperside bands ochre	**hippomene hippomene** (p. 32)
—		Hind wing tail at vein 4 long (± 4 mm.) and thin. Upperside bands orange	**hippomene madegassorum** (p. 33)
15	(13)	Upperside bands orange-ochre	16
—		Upperside bands deep reddish orange	**dimorphica mortoni** (p. 36)
16	(15)	Upperside hind wing inner black marginal line not terminating at vein 3	17
—		Upperside hind wing inner black marginal line terminating at vein 3	**dimorphica comoroica** (p. 35)
17	(16)	Upperside hind wing with dark submarginal spots or ocelli in spaces 4–6	**dimorphica aethiopica** (p. 35)
—		Upperside hind wing with no dark submarginal spots in spaces 4–6	**dimorphica dimorphica** (p. 33)

The *DELIUS* Group

Antanartia delius delius (Drury)

(Pl. 1, figs. 1, 2, 3, 4 and 5. Text-figs. 1, 8 and 15)

Papilio Nymphalis Phaleratus delius Drury, 1782 : 18, pl. 14, figs. 5, 6.
Papilio Eurocilia Fabricius, 1793 : 79, No. 247.
Vanessa Demonica Godart, 1819 : 301, No. 14.
Antanartia delius f. *kamitugensis* Dufrane, 1945 : 99 **syn. n.**

This, the type-species of the genus, is also the most variable and ranges from Sierra Leone in the west, to Uganda, Kenya and Tanzania in the east. When arranging the long series in the collection of the British Museum (Natural History) according to distribution, it was noticed that specimens from the eastern part of the range differed from those from further west and it was at first thought that the former might well represent an undescribed subspecies. However it was found that Dufrane (1945) had already separated a male specimen from the rather intermediate area of Kivu and named it *kamitugensis*, which necessitated a closer examination to determine the limits of these two forms or races and it was discovered that a rather ill-defined cline rather than two distinct races was involved. Prior to this, all the specimens had been measured and averaged and the results are given in the following Table.

Fore Wing Length from Base to Apex in Millimetres

	Males			Females		
	Max.	Min.	Average	Max.	Min.	Average
W. AFRICA Sierra Leone—Congo . 104 ♂, 35 ♀	34	24	28·3	36	26	32·8
E. AFRICA Uganda—Tanzania . . 72 ♂, 22 ♀	30	23	26·5	30	23	29

It will be seen from these that there is a marked difference in size from west to east. The western specimens have, on the upperside of the fore wing, the subapical and submarginal series of white spots usually well developed. On the underside of the fore wing the blind pupil of the indistinct ocellus in the discal area of spaces 1a and 1b is broadly edged with bluish white, the transverse discal area is yellowish and the basal cell spot often has no red-brown pupil and the red-brown centre of the central cell bar tapers and does not usually reach the median vein. The specimens from Uganda and further east are generally smaller and darker and usually lack the white subapical spots on the fore wing upperside except that in space 4 which is usually present. On the underside of the fore wing the basal cell spot has a distinct reddish pupil and the central cell bar is broadly divided with the same colour. The discal markings towards the hind margin in spaces 1a and 1b are more distinct and usually reach vein 2, the outer and inner lines are more yellow and the yellowish transverse discal area is often suffused with orange at the base of space 2 and the adjoining interspaces. There is a great deal of individual variation throughout this insect's range, the males being usually darker than the females. On the upperside of the fore wing, specimens frequently have the dark basal markings of the first interspace suffused with brown which extends beyond half-way to the tornus and into the cell and adjacent interspaces, sometimes even obscuring the black cell markings and coalescing with the black apical area. An extreme example of this type of variation is form *nigrescens* Suffert (1904 : 108) in which the fore wing is suffused with blackish brown with only a half crescent of orange present in the discal area from the inner margin to vein 3. On the hind wing upperside the black basal suffusion is almost confluent with the black discocellular bar. On the underside of both wings the markings are not noticeably darkened. In Uganda a different type of variation occurs and affects the paler markings of both wing surfaces. In form *amauroptera* Sharpe (1904 : 181) (Pl. 1, fig. 5) the yellowish orange markings of the upperside of both wings and the underside of the fore wing are darkened to a deep brownish red or burgundy with the darker markings showing through, except adjacent to the costa of the mid-cell of the underside of the fore wing, where it is cream. There is another form transitional to the above in which the deep velvety red-brown of the disc of the upperside of the fore wing appears darker than the plain brown of the apical and marginal areas. There is an even more extreme form that has the whole of the upperside of both wings an almost unicolorous deep brown, with the exception of the marginal markings of the hind wing, which remain quite distinct. On the underside, the discal area of the fore wing is a dull brown and both wings, with the exception of the basal and cell bars and spots, lack the rufous tone present in form *amauroptera*.

***Antanartia delius guineensis* ssp. n.**

(Pl. 1, figs. 6 and 7)

In general appearance this subspecies is nearer to the Ugandan specimens than to those from the West Coast mainland.

♂. *Upperside.* Fore wing length 26–30 mm. The orange-red transverse area suffused and darkened from the median vein towards the hind margin, which is the reverse of the coloration of the western mainland specimens, in which the costal area is darkened. Both series of white spots in the apical area distinct ; the red discal area of the hind wing much darkened basally, so that the black-brown discocellular bar and the costa are hardly discernible. One specimen has the whole basal area as far as the inner submarginal line a uniform brown. *Underside.* Fore wing very similar to the typical Ugandan specimens having the yellowish transverse discal area tinged with orange and the black basal markings in space 1b and the cell outlined in brilliant lilac. There is a diffuse patch of lilac beyond the cell and the inner submarginal line in spaces 3 and 4 is edged with this same colour. Hind wing markings generally more distinct and more suffused with lilac discally than in specimens from Uganda.

♀. Unknown.

Holotype ♂. FERNANDO PO (Hewitson coll.).

Paratypes ♂. 1, same data as holotype ; 1, Fernando Po (Godman-Salvin coll.) ; 1, Fernando Po (L. Frazer coll.).

Distribution. This subspecies is confined to the island of Fernando Po in the Gulf of Guinea, though there is another male which is indistinguishable from it labelled "Angola" (Grose-Smith coll. ex. Joicey Bequest) which may probably be wrongly labelled.

A probable interspecific hybrid between *Antanartia delius* (Drury) and *Antanartia schaeneia* (Trimen)

(Pl. 2, figs. 8 and 9. Text-fig. 10)

A female specimen of *Antanartia* was received from Mr. T. H. E. Jackson of Kenya which was taken at Budongo, Bunyoro, Uganda in June, 1938 by C. Cripps. On the upperside, this specimen resembles a dark example of *schaeneia* superficially, as it has the sharply defined inner margin to the transverse orange band of the fore wing and the hind wing completely brown as far as the orange margin so characteristic of *schaeneia*. The orange bands however are slightly deeper in colour and are nearer to *delius* in this respect, that of the hind wing has the dark interneural submarginal bars which both species have, though they are more prominent in *schaeneia*. In space 1b of the fore wing there is a prominent dark spot in the orange band which neither species has. On the underside however this spot is even more noticeable as it is larger and surrounded with ochre, while the remainder of the band is brownish in coloration similar to that only found in *delius* form *amauroptera* Sharp from Toro. It is interesting to note that one or two specimens of *delius* also have a trace of a spot in the above mentioned position. Apart from the coloration of the fore wing band, the underside is indistinguishable from that of *schaeneia*. *Antanartia delius* and *schaeneia* fly together in Uganda and their genitalia appear sufficiently close as not to preclude the possibility of a successful mating and as the genitalia of this specimen appear mid-way between the two species I conclude that it may possibly be the result of a feral cross between them.

Antanartia schaeneia schaeneia (Trimen)

(Pl. 2, figs. 10, 11 and 12. Text-figs. 2, 9 and 16)

Pyrameis Hippomene (Hübner) Trimen, 1862 : 121. [Misidentification from Boisduval, 1833 : 191].
Eurema schaeneia Trimen, 1879 : 329.
Hypanartia commixta Butler, 1880 : 336.

The nominate subspecies occurs in South Africa in Cape Province, Natal and as far north as Transvaal. According to Swanepoel (1953) it inhabits rain-forests, preferring the higher elevations where mists are prevalent. Specimens from still further north in Rhodesia, Zambia, Tanzania, Kenya and Uganda belong to a distinct subspecies.

Antanartia schaeneia dubia ssp. n.

(Pl. 2, figs. 13, 14 and 15)

♂. *Upperside.* Fore wing length 21–29 mm., similar to nominate subspecies but the orange transverse band slightly broader and the inner edge sometimes stepped at vein 1. Hind wing, the marginal orange band between vein 4 and apex not smudged at apex and with the submarginal shading not as distinct, particularly in spaces 4 and 5. *Underside.* Fore wing, the inner edge of pale transverse band appears slightly smoother centrally, due to the outer dark bar in space 2 barely reaching vein 2. However at vein 1 it is stepped or cut off abruptly, whereas in the nominate subspecies the dark bar in space 2 is shaded outwardly and diagonally towards the tornus and vein 1, so that the inner edge of the transverse band is straighter in this area. Hind wing, similar to ssp. *schaeneia* but slightly more rufous.

♀. As male but markings slightly broader and paler generally on both upper and underside. Fore wing length 25–30 mm.

Holotype ♂. MALAWI : Nyika, Kasungu Mt., 7,200 ft., 4.iii.96 (*R. Crawshay*).

Allotype ♀. MALAWI : Slopes of Mt. Mlanje, vi.1913 (*S. A. Neave*).

Paratypes : RÉPUBLIQUE DU CONGO, 3 ♂ : Kirisimbi Volcano, Kivu District, ix ; W. slopes of Ruwenzori, xii, 2,500 m. ; Forest 90 km. W. of Lake Albert-Edward, 1,000 m. ii. UGANDA, 36 ♂, 6 ♀ : Ruwenzori District ; E. Ruwenzori, 6–13,000 ft., ii ; W. side Bwamba Pass, 5,500–7,500 ft., xii–i ; N. Ruwenzori, 6,000–8,500 ft., xi ; Mt. Ruwenzori, 6,000–9,000 ft., ii ; Namwamba Valley, 6,500 ft., xii–i ; Fort Portal, ii ; Kigezi district, Mafuga Forest, 7,500–8,500 ft., i–ii ; Rutenga Forest, vi ; Kanaba Gap, vi ; Mt. Kokanjero, S.W. of Elgon, 6,400 ft., viii ; Subugo Forest, xii ; Kakamega Forest, Mau, xii. RWANDA, 1 ♂, 1 ♀ : Rugege Forest, Lake Kivu, 8,000 ft., xii ; Mkoko River, iv. KENYA, 82 ♂, 13 ♀ : E. Slopes Aberdare Mts., 7,000–8,500 ft., ii ; Yala River, Kakunga Forest, 4,800–5,300 ft., v ; S. Foot and slopes Mt. Elgon, 5,100–5,800 ft., vi ; Escarpment, 6,500–9,000 ft., ii, iii, xii ; Hoey's Bridge ; Meru district, Mt. Kenya, ix ; Mt. Kenya, 9,500 ft., i ; Mt. Kenya, Naro Moro, 8,000 ft., viii ; Subukia, xi; Nguru Hills ; Nyeri ; Kikuyu, Roromo ; Nairobi ; Patsho, Nandi Country, xii ; Rau, Nandi Country, ii. TANZANIA, 8 ♂, 3 ♀ : W. Kilimanjaro, 4,500–5,000 ft., xii–ii ; Mt. Kilimanjaro, Marango, ii ; Magazine Hill, v. MALAWI, 7 ♂, 12 ♀ : 3 ♂, 8 ♀, same data as allotype ; Mlanje Boma, 2,400 ft., iv–v ; Mlanje Plateau, 6,500 ft., xi ; Nyankowa Mt., W. of Lake Nyasa, 6,500 ft., iv ; Lake Shirwa, Chikala. RHODESIA, 7 ♂, 4 ♀ : 1 ♂, Umtali, iii ; 1 ♂, Laurenceville, Vumba, v ; 1 ♂, 2 ♀, Mt. Selinda, ii, v, ix ; [B.M. (N.H.)]. 1 ♂, 2 ♀, Mt. Selinda, ix ; 1 ♂, Vumba Mts, ii ; [National Museum, Nairobi]. 2 ♂, Vumba Mts, v ; [B. K. West coll.].

Distribution. This is a montane subspecies, generally inhabiting elevations over 4,000 feet in the Kivu district of the République du Congo, Uganda, Rwanda, Kenya, Tanzania, Malawi and Rhodesia.

Antanartia schaeneia diluta Rothschild & Jordan

(Pl. 3, figs. 16 and 17)

Vanessa schoeneia [sic] (Trimen) Oberthür, 1883 : 723.
Antanartia schaeneia diluta Rothschild & Jordan, 1903 : 510.

This very distinct subspecies is characterized by the normal transverse orange band of the fore wing and the marginal band of the hind wing upperside being much narrower and paler in the male and almost white in the female.

Antanartia borbonica (Oberthür)

This beautiful species, which is confined to the Mascarene Islands, is wrongly stated by Aurivillius (in Seitz, 1913 : 228) to occur also in Madagascar. Though faintly resembling the previous species or even *hippomene madegassorum* (Aurivillius) in appearance, it is in fact a very distinct species which has evolved a marked venational difference from the other members of the genus, due no doubt to the extreme isolation of its habitat. Rothschild & Jordan (1903 : 509) in their definition of the genus *Antanartia* state " The third subcostal branch of the fore wing stands, moreover, much farther from the cell than in *Hypanartia*, The cell of the hind wing is closed, the cross-vein standing distally of the point of the origin of M^1, while it is placed opposite M^1 or proximally of it in *Hypanartia dione*, *kefersteini*, *lindigi* etc." The first part of this statement cannot apply to either genus as the third subcostal branch (vein 9) and also vein 10 arise near the end of the cell in all species of both *Antanartia* and *Hypanartia*, except *borbonica*, which is unique in having veins 9 and 10 on a common stalk from the cell-end. The second part, relating to the cross-vein, is only partly correct in that only *Hypanartia arcaei* (Salvin) has the vein placed proximally, with the exception of *borbonica*, which has the cross-vein standing well beyond the point of origin of veins 3 and 4. From these facts it would appear that Rothschild & Jordan based their venational characters for the genus *Antanartia* on those of *borbonica*, the one aberrant member.

Antanartia borbonica borbonica (Oberthür)

(Pl. 3, fig. 18. Text-figs. 3, 11 and 17)

Vanessa hippomene (Hübner) Boisduval, 1833 : 191, pl. 8, figs. 3, 4.
Vanessa borbonica Oberthür, 1880 : 164.

This, the nominate subspecies, is confined to the island of Réunion.

Antanartia borbonica mauritiana Manders

(Pl. 3, fig. 19)

Antanartia hippomene mauritiana Manders, 1908 : 437.
Antanartia borbonica mauritiana Manders ; Aurivillius (in Seitz), 1913 : 228.

This subspecies, which has only been taken on the island of Mauritius and which may now be extinct, is easily separable from ssp. *borbonica* by its smaller size and the orange coloration of the post-discal spots in spaces 4–6 of the upperside of the fore wing, which are white in the nominate subspecies, and the inner edge of the orange transverse band of the same wing surface, which is sinuate in *mauritiana* and straight in ssp. *borbonica*.

The *HIPPOMENE* Group

Antanartia abyssinica (Felder)

This species is the smallest of the genus and is distinguished by its lack of a tail at vein 4 on the hind wing. On examination of a long series from the whole of its known distributional areas it was noticed that there are three distinct subspecies involved.

Antanartia abyssinica abyssinica (Felder)

(Pl. 3, fig. 20. Text-figs. 4, 12 and 18)

Pyrameis abyssinica Felder, 1867 : 397, 589.

The nominate subspecies is confined to Ethiopia.

***Antanartia abyssinica jacksoni* ssp. n.**

(Pl. 3, fig. 21)

♂, ♀. Similar to the nominate subspecies but has the submarginal ocelli of the upperside of the hind wing more equal in size and that in space 2 usually with a pupil, moreover the ochre submarginal band is not broadened so noticeably in space 5. Fore wing length ♂, 17–21 mm., ♀, 20–23 mm.

Holotype ♂. KENYA : Mt. Elgon, vii.1937 (*T. H. E. Jackson*).

Allotype ♀, same data as holotype.

Paratypes : KENYA, 60 ♂, 24 ♀ : Aberdare Mts, 7,000–9,500 ft., ii ; Mt. Elgon, 5,100–5,800 ft., vi, vii, x ; Mt. Kenya, 4,500–8,500 ft., ii, ix ; Crater Lake, N.W. of Meru, 5,000–7,000 ft., ii ; Masai Reserve, Mara River, v; Hoey's Bridge, 6,200 ft. ; Embi ; Patsho, Nandi Country, xii ; Nairobi ; Escarpment, 6,600–9,000 ft., i, ix, x, xi, xii ; Kikuyu Escarpment, Kijabe to Limoru, Uganda R., 6,800–7,400 ft., iii ; Lake Nakuru, 6,100 ft., ix ; Eldoma Ravine, iii ; Yambeni Range, Mt. Kenya Dist., 3,000 ft., xii ; Nyeri, i ; Kikuyu, Roromo. TANZANIA, 13 ♂, 4 ♀ : Old Moschi, iv ; Ngorongoro Crater, Arushu Dist., 5,800–7,800 ft., ii ; W. Shore of Lake Manyara, ii–v ; Meru, 7,000 ft., xii, ii ; W. Kilimanjaro 4,500–5,000 ft., xii–ii ; Edge of Olomoti Crater, Arushu Dist., 10,000 ft., ii.

Distribution. Apparently widely distributed in Kenya and Tanzania in suitable localities at altitudes from 3,000–10,000 feet.

***Antanartia abyssinica vansomereni* ssp. n.**

(Pl. 3, figs. 22 and 23)

♂, ♀. Easily distinguished from the other two subspecies by the upperside of the fore wing having the orange-ochre transverse band much broader and the dark basal area more tawny, so that the black central cell-bar, which is broken in this subspecies, is more conspicuous. The marginal band of the hind wing is broader and almost encloses the distinct spots and ocelli at its inner edge. Fore wing length, ♂, 19–22 mm., ♀, 20–24 mm.

Holotype ♂. RÉPUBLIQUE DU CONGO : Upper Oso River, N.W. Kivu, 4,000 ft. Forest with some grass. ii.1924 (*T. A. Barns*).

Allotype ♀. Same data as holotype.

Paratypes: UGANDA: 7 ♂, 1 ♀, E. Ruwenzori, 5,000–13,000 ft., ii.1906 (*G. Legge & A. F. R. Wollaston*); 1 ♀, Ruwenzori, 6,000–8,000 ft. (*Scott Elliot*); 2 ♂, Toro, xi–xii.1900 (*H. B. Rattray*). RÉPUBLIQUE DU CONGO: 4 ♂, 1 ♀, Mt. Niragongwe, N. of Lake Kivu, 1900–3,000 m., ix.1907 (*R. Grauer*); 1 ♂, Karissimbi Forest, Kivu, 1919 (*T. A. Barns*); 2 ♂, Mikeno Mt., N. Kivu, x.1919 (*T. A. Barns*); 1 ♂, Bukeyei, 6,000 ft., 21.v.1926 (*F. G. Jackson*); 1 ♀, Congo, 1926 (*F. G. Jackson*); 3 ♀, Kitanga; 3 ♂, 1 ♀, Marienseen to Issawi, 1,000 m., vii.1907 (*R. Grauer*); 1 ♂, Nr. Kisenyi, N.E. Shore of Lake Kivu, 3,600–5,000 ft., vii, viii.1926 (*F. G. Jackson*). RWANDA: 3 ♂, 1 ♀, Kissenyi, Lake Kivu, x.1907 (*R. Grauer*).

Distribution. This subspecies seems confined to the Kivu and adjacent areas of the République du Congo, western Uganda and Rwanda. There is one specimen labelled " Mkoma Mt. South Urindi Dist., E. Tanganyika, T. A. Barns " the accuracy of which seems extremely doubtful, as this locality is about one thousand miles away from the headquarters of *vansomereni*. In the Ruwenzori Range it has been recorded up to 13,000 feet.

These two newly described subspecies are named after Mr. T. H. E. Jackson and Dr. V. G. L. van Someren of Kenya, both of whom have done so much for the study of African Rhopalocera.

Antanartia hippomene (Hübner)

Up to the present time *hippomene* has been thought to be a single species inhabiting the African continent from Ethiopia to South Africa and the West Cameroons area, with a subspecies in Madagascar. A closer examination of the extensive series in the British Museum (Natural History) has shown however that only the South African and Malagasy populations should be attributed to *hippomene* and that the others belong to an undescribed species with four races, one in Ethiopia, another in Central and East Africa as far south as Rhodesia and the Transvaal, another in West Cameroon, Nigeria and Fernando Po and yet another in the Comoro Islands.

Hübner's figure of this species leaves no doubt as to its identity but the brief description by Aurivillius [in Seitz, 1913 : 228, pl. 52 (d)] is of little diagnostic value and he figures the newly separated species *dimorphica* not *hippomene*. It should be pointed out that in the second line of his description the word " forewing " should read " hind wing ".

Antanartia hippomene hippomene (Hübner)

(Pl. 3, figs. 24 and 25. Text-figs. 5, 13, 19)

Hypanartia hippomene Hübner, 1823 : 2, pl. 25.
Eurema hippomene (Hübner) Trimen, 1887 : 204.
Antanartia hippomene (Hübner) Swanepoel, 1953 : 209, pl. 11, fig. 19 [in colour].

♂, ♀. Characterized by the palpi being cream ventrally with sparse black hairs situated outwardly in this area. Fore legs cream with a narrow brown stripe on the front inner surface, the long hairs of the male in this area cream. Antennal shaft brown above, whitish below and at the base of club, which is blackish brown with a reddish tip. *Upperside*. Fore wing has outer margin sinuate and bent inwards at spaces 3 and 4, which gives the apical area a slightly falcate appearance. The yellowish ochre transverse discal band tapers sharply to a blunt point and only just touches the hind margin. There is a small white spot usually present in space 3. The coloration of the cell-base not noticeably different from the remainder of the wing base. Hind wing, black brown basal area extends along the costa to apex and into the yellow ochre marginal band along the veins, so that the inner edge of band is scalloped. The two ocelli in spaces 2 and 3 are well developed, that in space 2 tending to have a yellowish orange ring round it, which is more noticeable outwardly. The two marginal lines in the tornal area broad, the inner extending to vein 4 and joining that of the rather blunt tail. *Underside.* Fore wing, transverse discal band cream slightly tinged with orange basad, the dark basal marks in cell outlined in cream, with a small cream triangular spot at extreme base of cell. The sexes are very similar on the underside. Fore wing length ♂, 22–26 mm., ♀, 23–30 mm.

Distribution. The nominate subspecies is confined to suitable forested areas in South Africa from the Cape to the Transvaal.

Antanartia hippomene madegassorum (Aurivillius)

(Pl. 4, figs. 26 and 27)

Hypanartia hippomene var. *madegassorum* Aurivillius, 1898 : 129.

♂, ♀. Similar to ssp. *hippomene* but the antennae are reddish brown throughout, outer margins of fore and hind wings more wavy and the tails of hind wing longer and more sharply pointed. *Upperside.* Fore wing, central cell bar separated from base by small patch of orange, and transverse discal band this same colour. Hind wing marginal band also orange. *Underside.* Fore wing, ground colour darker particularly towards apex but transverse discal band ochre and not orange, as in nominate subspecies. The sexes are similar in coloration. Fore wing length ♂, 23–25 mm., ♀, 25–27 mm.

Distribution. Confined to the island of Madagascar and now believed to be extremely rare. Specimens from Beforo and S. Betseleo in British Museum (Natural History).

***Antanartia dimorphica dimorphica* sp. n.**

(Pl. 4, figs. 28, 29, 30, 31, 32 and 33. Text-figs. 6, 14 and 20)

This species may be separated from *hippomene* by its more truncate fore wings, particularly in the female, and the deeper orange colour of the central part of the transverse band on the underside of the fore wing. The species exhibits considerable sexual dimorphism on the underside of the hind wing, the female resembling *hippomene madegassorum* in tone and the male being even darker.

♂. Palpi slightly more hirsute than *hippomene* and the black hairs longer ; fore legs browner, with brown and cream hairs inwardly, which give the leg the appearance of having a much broader stripe. *Upperside.* Fore wing, as *hippomene* but with less falcate apex and the orange transverse band not tapering to a point at hind margin. Usually without a small white spot in submargin of space 3. The base of the cell rufous-brown in contrast to the distinct black cell bar and the remaining basal coloration. Hind wing, the yellow orange marginal band extends to the apex, which is not darkened as in *hippomene*, and the inner edge generally straighter ; inner black submarginal line of tornus not often joined to black line of tail at vein 4. *Underside.* Fore wing, as *hippomene* but ground colour darker and the transverse discal band broader and orange as are the basal striae of the cell. There is no pale spot at the wing base. Hind wing, darker than *hippomene* with more of a purple gloss and the broad submarginal area has a smoother appearance.

♀. Similar to the male but wings slightly broader and the margin of hind wing slightly more wavy and the underside of hind wing considerably paler. Fore wing length ♂ 20–27 mm., ♀, 21–26 mm.

Holotype ♂. UGANDA: Ruwenzori Range, xii.1934–i.1935. B.M. E. Afr. Exp. Namwamba Valley, 8,300 ft. (*T. H. E. Jackson*).

Allotype ♀, same data as holotype but taken at 6,500 ft.

Paratypes, 1 ♂, 1 ♀ with same data as allotype. A large series of 122 ♂, 55 ♀ from the following localities and altitudes. RÉPUBLIQUE DU CONGO: Rutchuru–Kabali; Kisenyi, 3,600–5,000 ft.; S.W. Corner of L. Kivu, 6,300 ft., Karissimbi Volcano, Kivu; N.W. Lake Tanganyika, 1,700–1,900 m.; N.W. Kivu, 4,300 ft. UGANDA: E. Ruwenzori, 5,000–13,000 ft.; N. Ruwenzori, 6,000–8,500 ft.; Ruwenzori, Bwamba Pass, 5,500–7,500 ft.; Mt. Niragongwe, N. of L. Kivu, 1,900–3,000 m.; Mt. Mikeno, N. of L. Kivu, 1,900–2,400 m.; Mafugi Forest, Kigesi, 7,500–8,500 ft.; Rutenga Forest, Kigesi; Kayonza, Kigesi, 4,000 ft.; Kanaba Gap, Kigesi; Toro; Rutschuru plain; Mt. Kokajero, S.W. Elgon, 6,400 ft.; Daro or Durro Forest, Toro, 4,000–5,000 ft.; Mpanga Forest, Toro, 4,800 ft.; Mbale; Subugo Forest; Mau. RWANDA: Rugege Forest, E. of S. end of Lake Kivu. SUDAN: Lotti Forest. KENYA: Patsho, Nandi Country; Nandi Station; Nandi Plateau, 5,700–6,200 ft.; Eldoma Ravine; Escarpment, 6,500–9,000 ft.; Kipiperi, Aberdare Range, 8,000–9,000 ft.; Dabida, Rabai–Mombasa, 6,000 ft.; E. slopes, Aberdares, 7,000–8,500 ft.; Roromo, Kikuyu; Hoey's Bridge; Mt. Kenya, Meru dist. (Mt. Meru, Kenya dist.); Mara River, Masai Reserve; Nairobi, Kinangoli, 9,000 ft.; Kibwezi; Nyeri; Mbolo Hill, Voi District, 5,500 ft.; Mt. Mbololo, 5,000 ft.; Kilimanjaro, Mt. Elgon; Lumbwa, Wandanyi, 5,000 ft.; Mt. Kulal, 5,500 ft.; Mt. Marsabit. TANZANIA: Magazine Hill; Longido, W. Kilimanjaro, Ngare–Nairobi, 4,000–5,000 ft.; Mt. Rungwe, nr. N. Langenburg, 5,000–6,000 ft.; Itumba District, Meru, 8,000 ft.; Lushoto; District of Great Craters; Tukuyu. MALAWI: Mlanje Plateau, 6,000–7,000 ft.; Kasungu Mt., 7,425 ft.; Nyika Plateau. RHODESIA: Vumba (2 ♂, 1 ♀, National Museum, Bulawayo, Rhodesia); Laurenceville, 10 miles S. of Umtali (2 ♂, H. Cookson coll.); Chitora Hills, 30 miles S. of Umtali (1 ♂, H. Cookson coll.). TRANSVAAL: Woodbush (1 ♂, National Museum, Nairobi); Mariepskop, Pilgrims Rest district (1 ♂, Transvaal Museum, Pretoria); Graskop (1 ♂, Transvaal Museum, Pretoria); Haenertsburg (1 ♀, National Museum, Bulawayo. 1 ♂, 1 ♀, Transvaal Museum, Pretoria).

Distribution. A montane species occurring from about 4,000 to 13,000 feet in suitable habitats from the eastern edge of the République du Congo to Mt. Marsabit, Kenya in the north and as far south as the Transvaal. It was at first thought that the Rhodesian and Transvaal specimens might belong to a separate race, as the transverse orange band of the upperside of the fore wing is stepped at vein 1 and the dark basal area of the hind wing upperside extends into the orange marginal band along the veins, but there are similar specimens amongst those from Tanzania and Malawi and it would seem as if these southern specimens may be at the extremity of a cline.

***Antanartia dimorphica aethiopica* ssp. n.**

(Pl. 5, figs. 34 and 35)

♂, ♀. Distinguished from the nominate subspecies by presence on the upperside of hind wing of two or three extra black spots or ocelli situated just inside the dark basal area in spaces 4–6, that in space 4 sometimes having a faint blue ocellus. In this respect it resembles *Antanartia abyssinica* (Felder), the only other species in the genus that exhibits this character ; this resemblance is increased still further by the absence of tails in *abyssinica* and the very short tails in this race. Fore wing length ♂, 20–24 mm., ♀, 21–24 mm.

Holotype ♂. ETHIOPIA : Djem Djem Forest, 8,000–9,000 ft., 7–9.x.1926 (*H. Scott*).

Allotype ♀. ETHIOPIA : Dangila, 6,700 ft., 40 miles S. of Lake Tana, 3.viii.1926 (*R. E. Cheeseman*).

Paratypes : 2 ♂, same data as holotype ; 2 ♂, same data as allotype ; 5 ♂, 1 ♀, Abera, Djamdjam ; 1 ♂, 2 ♀, Abera, S. of L. Abasa ; 12 ♂, Gimera (Kaffa) to N. end of L. Rudolf ; 1 ♂, Badattino, Gindeberat ; 1 ♂, Dereta Mts., Kaffa ; 2 ♂, Kollu (Schoa) ; 3 ♂, Kankati, Djimma, S.W. Abyssinia ; 2 ♂, Aberasch, E. of L. Abai ; 1 ♀, Arbe, S. of L. Abasa ; 2 ♂, 2 ♀, Charada Forest, Kaffa, 6,000 ft. ; 1 ♂, 1 ♀, Mt. Zuquala, over 9,000 ft. ; Gamo Prov., Bonghé Valley ; 2 ♂, Gughé Highlands, 9,500–10,000 ft. ; 2 ♂, Luguala Crater, 9,000 ft. ; Mt. Chillálo, *c.* 9,000 ft. ; 5 ♂, 4 ♀, Scioa ; 5 ♀, Scioatalit (M.S.) ; 1 ♂, 2 ♀, Chercher ; 2 ♀, Jam-Jam ; 1 ♂, Muti, 6,000–8,000 ft.

Distribution. This race is confined to the highlands of Ethiopia at altitudes up to 10,000 feet.

Rothschild & Jordan (1903 : 509) when dealing with specimens of this subspecies stated " The Abyssinian specimens of *hippomene* are all short tailed, but do not present any constant differences from East and South African ones " but that they were found to have been placed over a blank label in the Rothschild collection.

***Antanartia dimorphica comoroica* ssp. n.**

(Pl. 5, figs. 40 and 41)

♀. Can be separated from the other subspecies by the broad orange marginal band of the upperside of hind wing, which almost obscures the indistinct and blind ocellus in space 3 and the inner submarginal black line which terminates abruptly at vein 3 and does not invade the orange band towards vein 4. There is a small white spot in space 3 of the upperside of fore wing. Fore wing length 23–25 mm.

♂. Unknown.

Holotype ♀. GRAND COMORO Is. (Rothschild Bequest).

Paratypes: 3 ♀, same data as holotype.

Distribution. This subspecies is confined to Grand Comoro Island and it is of interest that the southern *hippomene* has reached Madagascar as *madegassorum* (Aurivillius), whereas the more northern *dimorphica* has only succeeded in reaching the Comoro Islands.

Antanartia dimorphica mortoni ssp. n.

(Pl. 5, figs. 36, 37, 38 and 39)

♂, ♀. Separated from the nominate subspecies by the broader and deeper orange coloration of the transverse discal band of the fore wing of both upper and undersides, and the marginal band of hind wing upperside which is noticeably scalloped at its inner edge in some specimens. Two specimens have the band widened considerably in space 5 in the same manner as in *abyssinica*. Fore legs of male have the hairs of inner surface cream as in *hippomene*. *Upperside*. Fore wing, no small white spot in space 3 and black central cell bar stands out clearly against the rufous tone of the cell. Fore wing length ♂, 21–25 mm., ♀, 23–24 mm.

Holotype ♂. W. CAMEROONS: Mt. Cameroon. On path from Buea to Mann's Springs, 7,500–10,000 ft. In montane grassland. 30.xii.1958 (*J. K. Morton*).

Allotype ♀. NIGERIA: Obudu Plateau, 5,200 ft., 1.ii.1965 (*R. G. T. St. Leger*).

Paratypes: 9 ♂, same data as holotype (5 in J. K. Morton coll.); 3 ♂, NIGERIA: Obudu Plateau, 5,200 ft., 31.i.1965; 2 ♀, same data as allotype; 1 ♂, Bamenda Plateau (*P. J. L. Roche*). 1 ♀, W. CAMEROONS: Bamenda, iv.1919 (D. Cator coll.). 1 ♂, 2 ♀, FERNANDO PO: 3,000–4,000 ft. vi.1926 (*T. A. Barns*).

Distribution. West Cameroons, Nigeria and the island of Fernando Po.

This subspecies is named after Prof. J. K. Morton of Fourah Bay College, Freetown, Sierra Leone, who captured the first series of this insect which, when submitted for determination, was instrumental in the commencement of the present investigation.

ABNORMAL SCALING IN THE GENUS *ANTANARTIA*

During the examination of the series of this genus it was noticed that several specimens had the orange-red of the transverse bands of the upperside of the fore wings reduced in intensity and it was thought that this reduction might be due to a scale defect. This proved to be correct and as the specimens varied in degree of abnormality every specimen was examined microscopically.

Normally the scales are arranged over the wing surface with their bases towards the wing base in roughly parallel double lines running concentrically from the wing base and interspaces, each double row consisting of an upper and under layer of scales arranged alternately (see Bayard, 1932). The scales of the lower or basal layer are adpressed to the wing membrane and partially overlap each other and do not appear to be so heavily pigmented as those of the upper. The upper layer consists of slightly longer scales than the lower and overlap one another as well as covering and concealing the lower basal layer though in fact they are slightly inclined to the wing surface. In the specimens exhibiting abnormal scaling, the individual scales are rolled and twisted longitudinally to a point and in extreme cases they resemble thick hairs. Associated with this deformity is either a lack of, reduction of, or alteration to, the pigment. In all the specimens examined only the paler scales were affected, i.e. white, yellow, orange or red and none was found with the dark brown or black scales deformed. In some specimens only a few scales of one layer are affected, sometimes scattered and sometimes in small patches and in others a more general defect is present, affecting most if not all the paler scales and it is these that are discernible to the unaided eye due to a general alteration in colour. The white scales of the apical spots of the upperside of the fore wing consist of only the basal layer and these scales seem to be the first affected when a scale defect is present in a specimen. In some examples that have the majority of the pale scales defective the scales of the white apical spots are often absent, though their sockets are present on the wing membrane denoting a transition between the two types of defect mentioned by Cockayne (1922 : 48). In general it seems as if the scales of the fore wings are affected more than those of the hind wings and the uppersides more than the undersides. In the following Table which gives the total number of specimens of each species and subspecies examined and the percentage found to have abnormal scaling, it will be seen that of the six species, *hippomene* is the most affected and *delius* the least, while *borbonica* has no defective scaling though this result may well be due to insufficient material.

Specimens of ANTANARTIA *with Abnormal Scaling*

	Total examined		% of abnormalities	
	♂	♀	♂	♀
delius delius	237	63	1·3	—
delius guineensis	5	—	—	—
schaeneia schaeneia	8	15	12·5	—
schaeneia dubia	142	42	2·8	9·5
schaeneia diluta	52	16	—	6·3
borbonica borbonica	13	10	—	—
borbonica mauritiana	8	5	—	—
abyssinica abyssinica	30	12	16·6	—
abyssinica jacksoni	129	42	15·5	33·3
abyssinica vansomereni	25	10	32·0	10·0
hippomene hippomene	15	20	40·0	30·0
hippomene madegassorum	4	2	—	—
dimorphica dimorphica	95	59	27·0	13·3
dimorphica aethiopica	65	23	21·5	39·1
dimorphica mortoni	5	2	—	—
dimorphica comoroica	—	3	—	—

PARALLEL MODIFICATION IN THE GENUS *ANTANARTIA*

There is a small but significant amount of parallel modification or similarity, amongst the races of the species that are sympatric. In Ethiopia particularly, the males of the subspecies of the three species that occur there—*schaeneia diluta*, *abyssinica abyssinica* and *dimorphica aethiopica*, are generally smaller and have shorter and blunter tails, if present, than elsewhere. On the upperside of the fore wings they tend to have the white subapical spots often tinged with ochre and the orange bands of both wings are slightly narrower. On the upperside of the hind wings *dimorphica aethiopica* has a series of well-defined extra spots basad of the orange marginal band very similar to those of *abyssinica abyssinica* and also the apex is clouded in a similar manner. Generally the Ethiopian races are nearer in appearance to those from South Africa, where they occur, than to those from the central part of the African continent, i.e. *schaeneia diluta* is nearer to *schaeneia schaeneia* than to *schaeneia dubia* and *dimorphica aethiopica* is nearer to *hippomene hippomene* than to *dimorphica dimorphica*, *hippomene* being the replacement species for *dimorphica* in South Africa. In the Malagasy Republic and the Mascarene island of Réunion the two species *hippomene* and *borbonica* occur separately but are similar in pattern, shape and colour. They both have long pointed tails, very crenate wing margins and the same broad, deep orange bands on the upperside though *hippomene madegassorum* retains the normal ochre colour of the transverse band on the underside of the fore wing of the nominate race.

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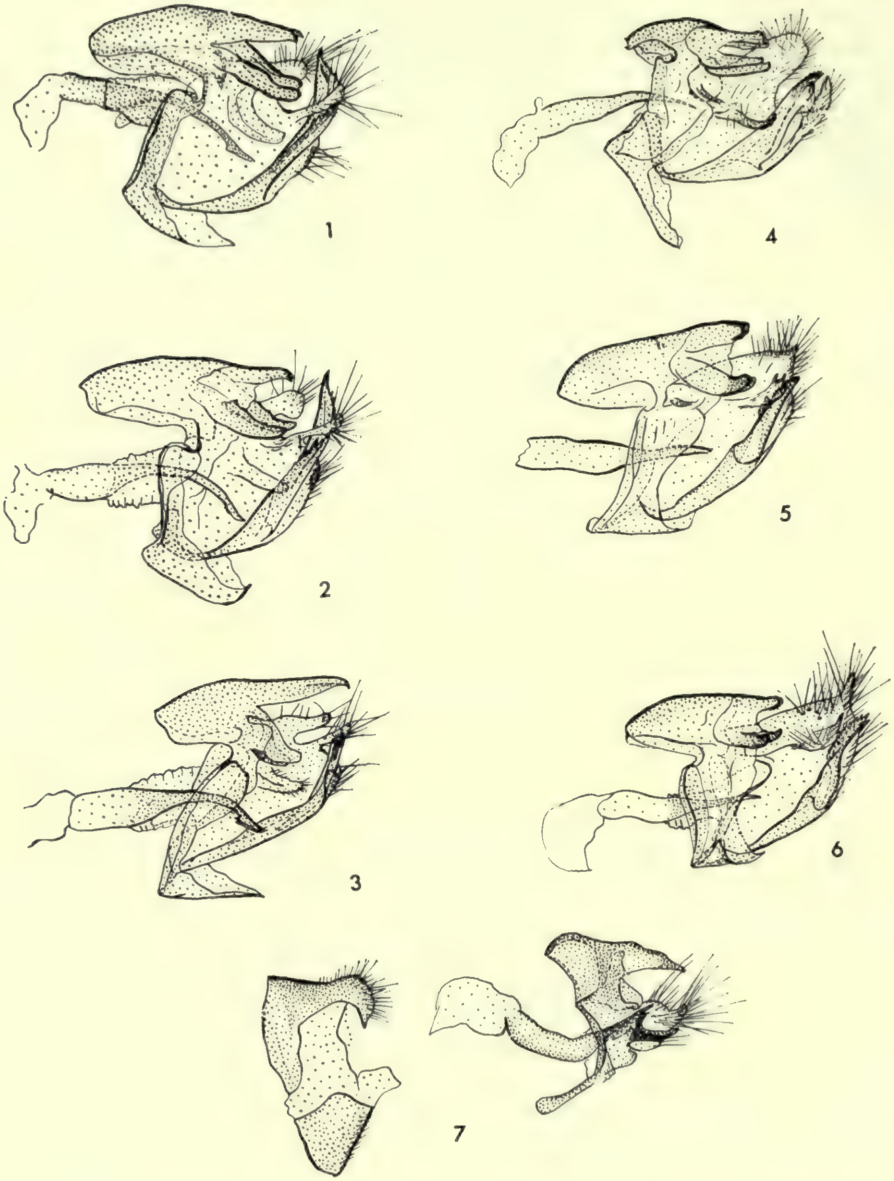
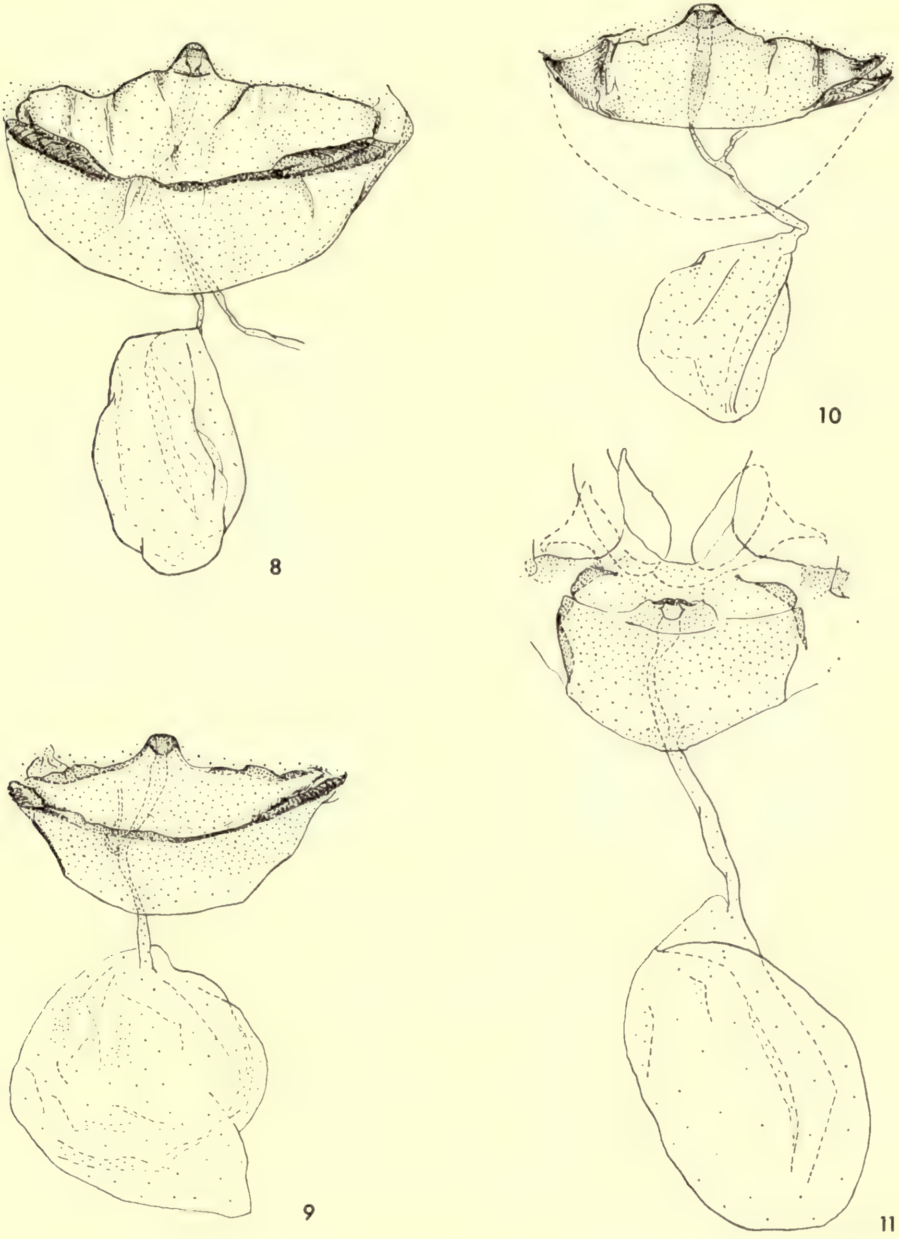
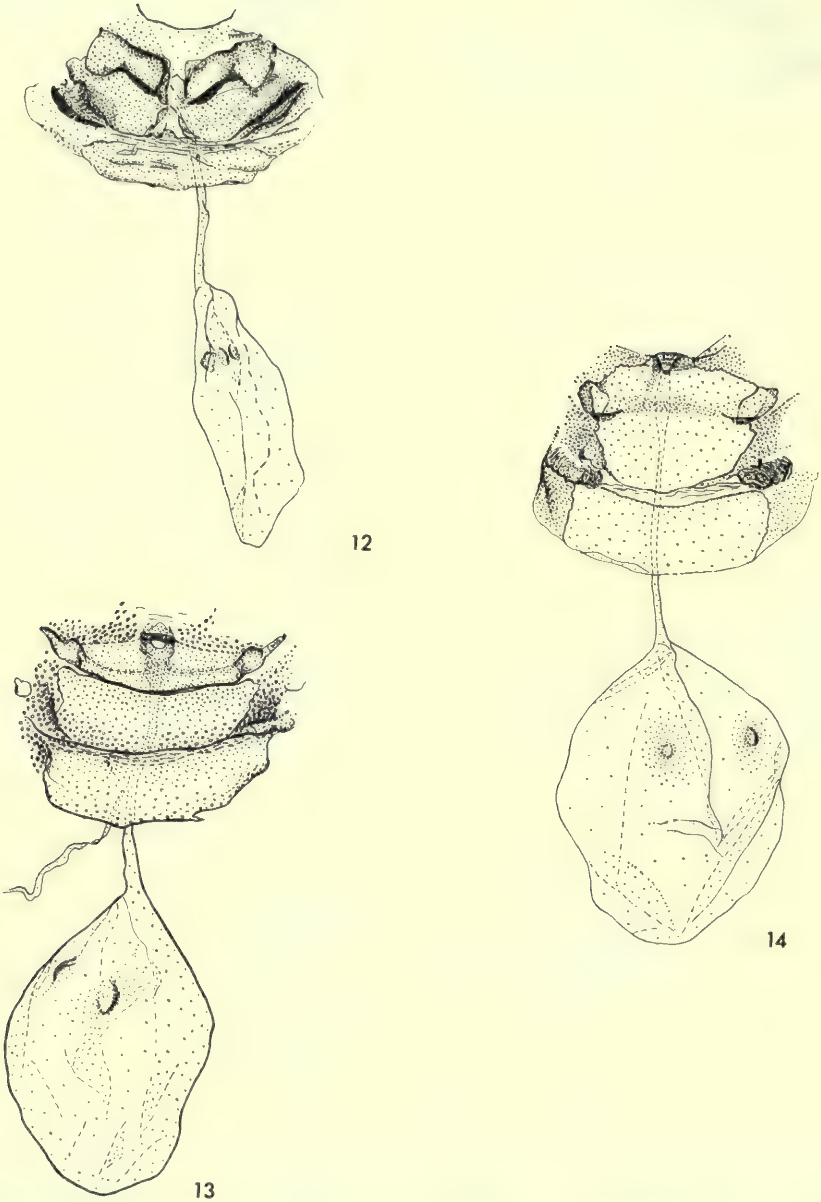


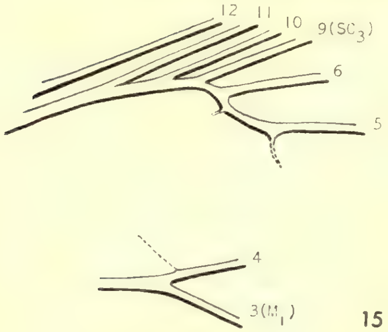
Figs. 1–7. Male genitalia of *Antanartia* Rothschild & Jordan and *Hypanartia* Hübner with left-hand valva removed. 1, *Antanartia delius* (Drury) ; 2, *A. schaeneia* (Trimen) ; 3, *A. borbonica* (Oberthür) ; 4, *A. abyssinica* (Felder) ; 5, *A. hippomene* (Hübner) ; 6, *A. dimorphica* sp. n. ; 7, *Hypanartia kefersteini* (Doubleday & Hewitson) with the eighth abdominal tergite and superuncus.



FIGS. 8–11. Female genitalia of *Antanartia* Rothschild & Jordan. 8, *Antanartia delius* (Drury) ; 9, *A. schaeneia* (Trimen) ; 10, *A. delius* × *schaeneia* hybrid (?) ; 11, *A. borbonica* (Oberthür).



FIGS. 12–14. Female genitalia of *Antanartia* Rothschild & Jordan. 12, *Antanartia abyssinica* (Felder) ; 13, *A. hippomene* (Hübner) ; 14, *A. dimorphica* sp. n.



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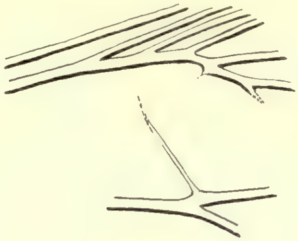

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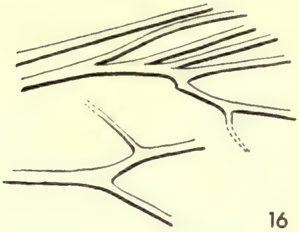

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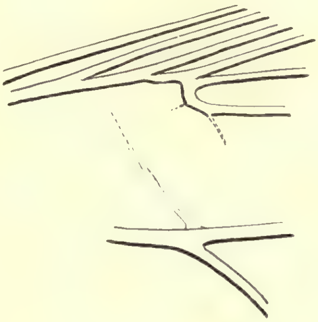

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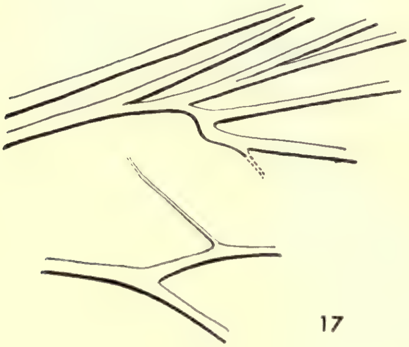

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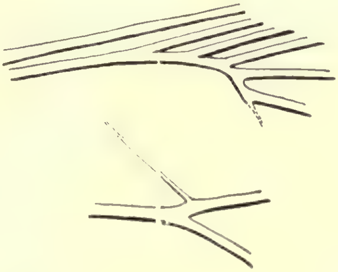

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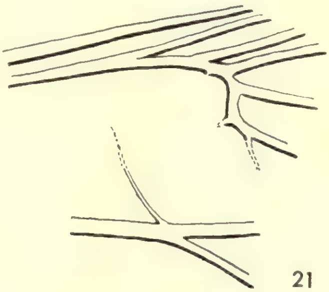

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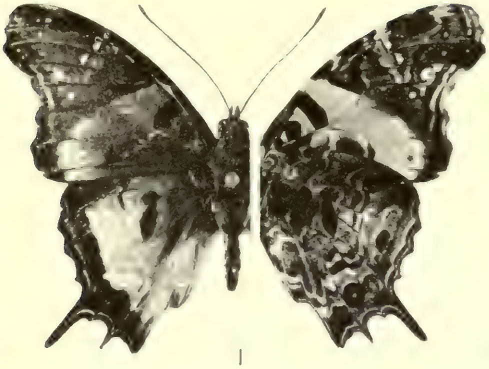
FIGS. 15–21. Venation of *Antanartia* Rothschild & Jordan and *Hypanartia* Hübner: Upper. Area adjacent to the upper apex of the discoidal cell of fore wing. Lower. Discocellular area adjacent to veins 3 and 4 of hind wing. 15, *Antanartia delius* (Drury); 16, *A. schaeneia* (Trimen); 17, *A. borbonica* (Oberthür); 18, *A. abyssinica* (Felder); 19, *A. hippomene* (Hübner); 20, *A. dimorphica* sp. n.; 21, *Hypanartia kefersteini* (Doubleday & Hewitson).

PLATE 1

Upper and undersides of *Antanartia* Rothschild & Jordan

FIG. 1. *Antanartia delius delius* (Drury), ♂ Cameroons. Photos. Brit. Mus. (N.H.) Nos. 37294, 37295. FIG. 2. *A. delius delius* (Drury), ♀ Sierra Leone. Photos. Brit. Mus. (N.H.) Nos. 37296, 37297. FIG. 3. *A. delius delius* (Drury), ♂ S. Sudan. Photos. Brit. Mus. (N.H.) Nos. 37300, 37301. FIG. 4. *A. delius delius* (Drury), ♀ Kenya. Photos. Brit. Mus. (N.H.) Nos. 37302, 37303. FIG. 5. *A. delius delius* f. *amauroptera* Sharpe, ♂ Kenya. Photos. Brit. Mus. (N.H.) Nos. 37304, 37305. FIGS. 6 and 7. *A. delius guineensis* ssp. n. Holotype ♂, Fernando Po. Photos. Brit. Mus. (N.H.) Nos. 37298, 37299.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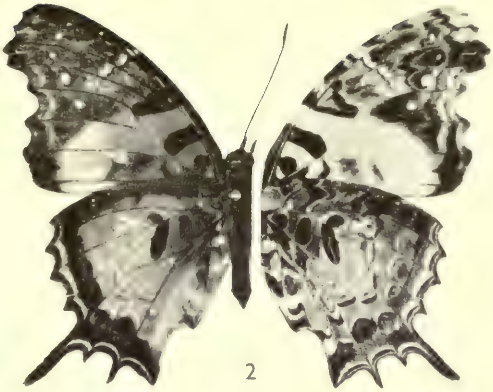
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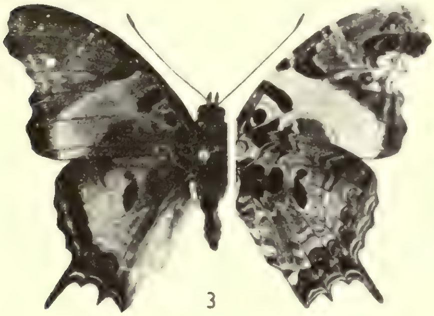
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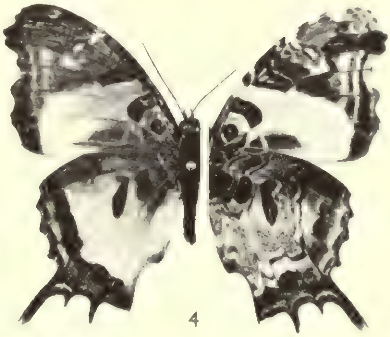
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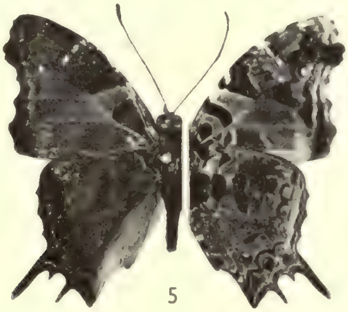
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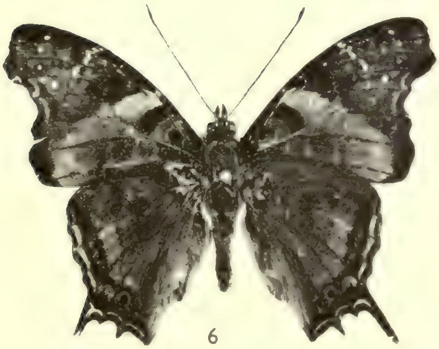
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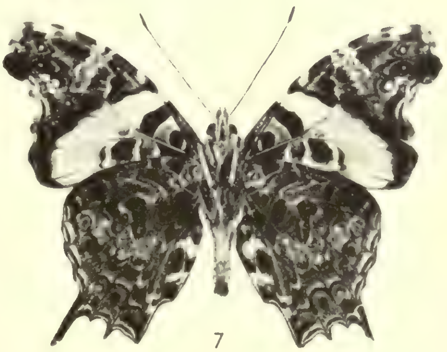
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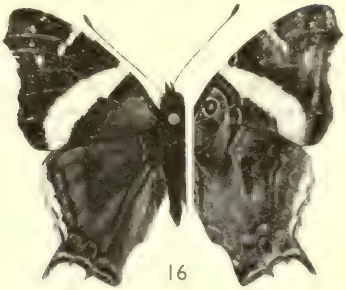
PLATE 3

Upper and undersides of *Antanartia* Rothschild & Jordan

FIGS. 16, 17. *Antanartia schaeneia diluta* Rothschild & Jordan ♂ and ♀ respectively, Ethiopia. Photos. Brit. Mus. (N.H.) Nos. 37314, 37315, 37316, 37317. FIG. 18. *A. borbonica borbonica* (Oberthür), ♂, Réunion. Photos. Brit. Mus. (N.H.) Nos. 37346, 37347. FIG. 19. *A. borbonica mauritiana* Manders, Paratype ♂, Mauritius. Photos. Brit. Mus. (N.H.) Nos. 37318, 37319. FIG. 20. *A. abyssinica abyssinica* (Felder), ♂, Ethiopia. Photos. Brit. Mus. (N.H.) Nos. 37320, 37321. FIG. 21. *A. abyssinica jacksoni* ssp. n., Paratype ♂, Kenya. Photos. Brit. Mus. (N.H.) Nos. 37322, 37323. FIGS. 22 and 23. *A. abyssinica vansomereni* ssp. n. Holotype ♂, N.W. Kivu. Photos. Brit. Mus. (N.H.) Nos. 37324, 37325. FIG. 24. *A. hippomene hippomene* (Hübner), ♂, Natal. Photos. Brit. Mus. (N.H.) Nos. 37326, 37327. FIG. 25. *A. hippomene hippomene* (Hübner), ♀, S. Africa. Photos. Brit. Mus. (N.H.) Nos. 37328, 37329.



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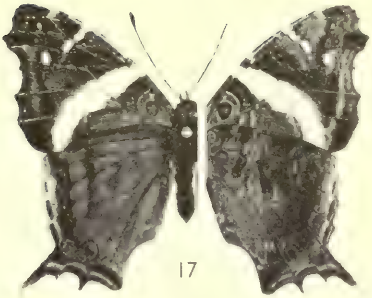

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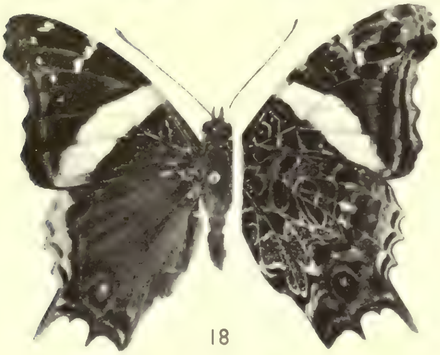

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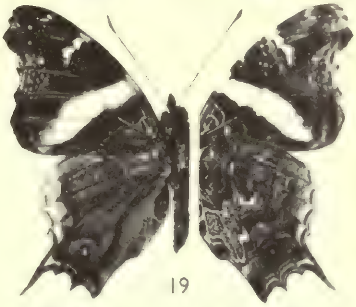

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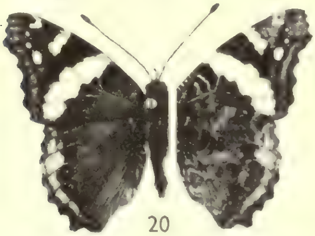

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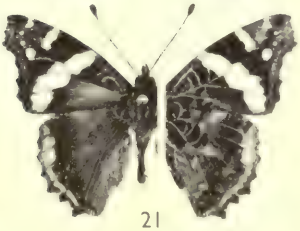

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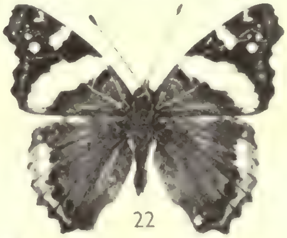

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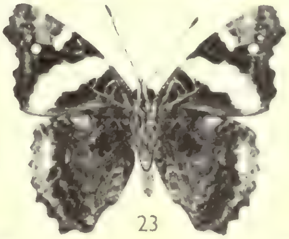

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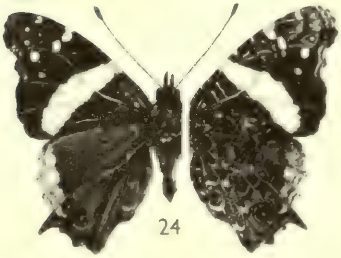

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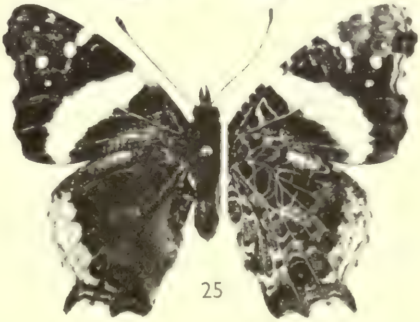

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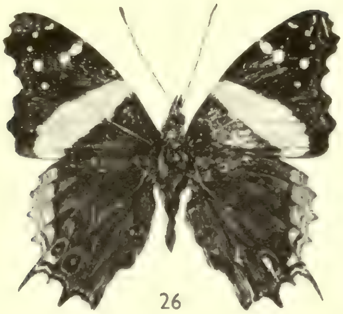
PLATE 4

Upper and undersides of *Antanartia* Rothschild & Jordan

FIGS. 26, 27. *Antanartia hippomene madegassorum* (Aurivillius), ♂ Madagascar. Photos. Brit. Mus. (N.H.) Nos. 37330, 37331. FIGS. 28, 29, 30, 31. *A. dimorphica dimorphica* sp. n., Holotype ♂ and Allotype ♀ respectively, Uganda. Photos. Brit. Mus. (N.H.) Nos. 37336, 37337, 37338, 37339. FIGS. 32, 33. *A. dimorphica dimorphica* sp. n. Paratype ♂ and ♀ respectively, Rhodesia. Photos. Brit. Mus. (N.H.) Nos. 37342, 37343, 37344, 37345.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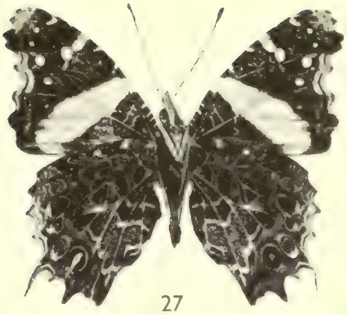
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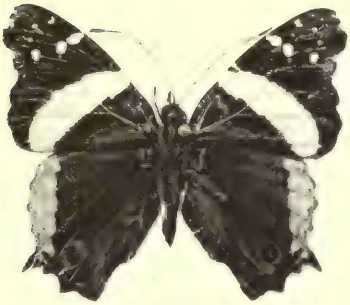
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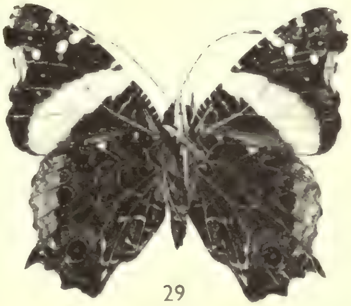
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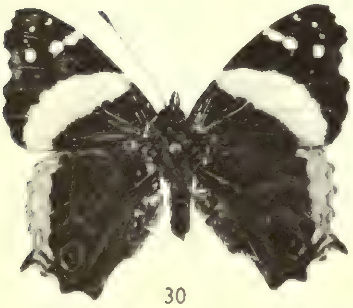
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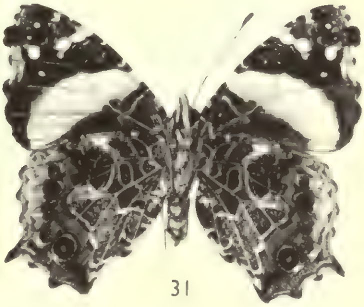
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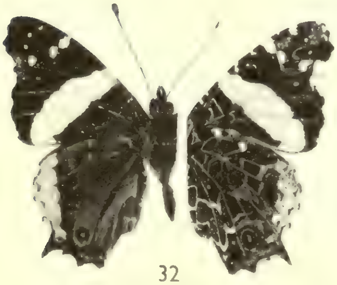
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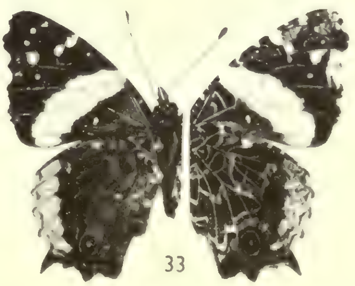
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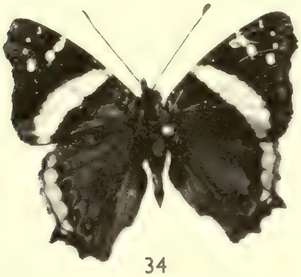
PLATE 5

Upper and undersides of *Antanartia* Rothschild & Jordan

Figs. 34, 35. *Antanartia dimorphica aethiopica* ssp. n., Holotype ♂, Ethiopia. Photos, Brit. Mus. (N.H.) Nos. 37340, 37341. Figs. 36, 37. *A. dimorphica mortoni* ssp. n., Paratype ♂. Cameroon, Photos. Brit. Mus. (N.H.) Nos. 37334, 37335. Figs. 38, 39. *A. dimorphica mortoni* ssp. n., Allotype ♀, Nigeria. Photos. Brit. Mus. (N.H.) Nos. 37400a, 37401a. Figs. 40, 41. *A. dimorphica comoroica* ssp. n., Holotype ♀, Comoro Is. Photos. Brit. Mus. (N.H.) Nos. 37332, 37333.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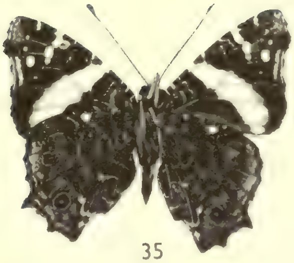
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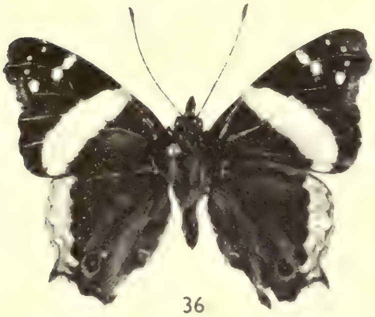
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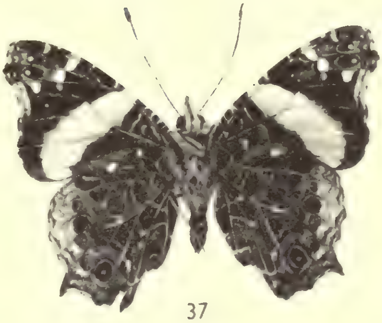
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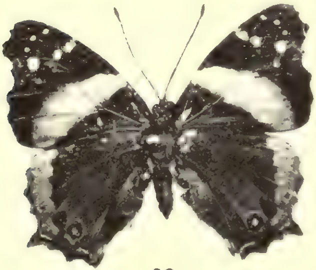
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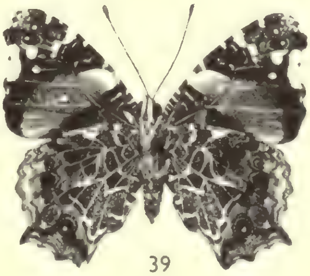
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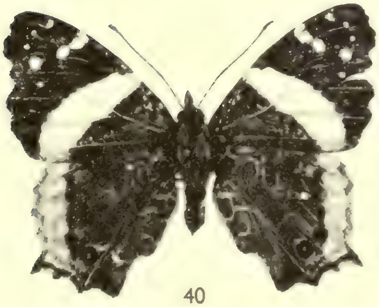
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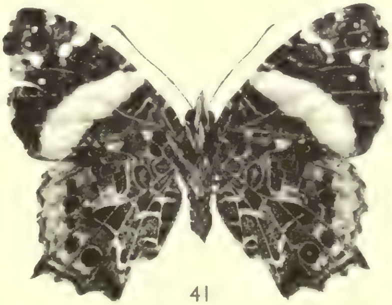
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NATURAL

REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE)

PART III

V. G. L. van SOMEREN

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 18 No. 3
LONDON : 1966

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NATURAL HISTORY

REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE)

PART III

BY

V. G. L. van SOMEREN

P.O. Box 24947, Karen, Kenya

Pp. 45–101 ; 5 *Maps*, 16 *Plates*

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 18 No. 3
LONDON : 1966

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REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE) PART III

By V. G. L. VAN SOMEREN

CONTENTS

Page

Synopsis 47
1. *Charaxes violetta* Grose-Smith and Its Races 47
  Descriptions and Notes 50
  Systematic List 54
2. The *Charaxes etesipe-penricei* Complex 54
  Descriptions and Notes 59
  Systematic List 69
3. *Charaxes pembanus* Jordan and *Charaxes usambarae* van Someren & Jackson 70
  Descriptions and Notes 70
  Systematic List 74
4. The *Charaxes berkeleyi* Group 74
  Descriptions and Notes 74
  Systematic List 97
Acknowledgements 99
References 99
Index 100

SYNOPSIS

One complex and twelve species, and their races and forms, of the genus *Charaxes* are dealt with in this paper. One new species, six new subspecies and one new form are described, and two subspecies and one race are raised to specific rank.

1. *CHARAXES VIOLETTA* GROSE-SMITH AND ITS RACES

It is well known that the species *violetta* has a wide range, extending from Delagoa Bay, through southern Mozambique to the eastern border of Rhodesia[1] (Vumba Mts. area), thence to Malawi, Tanzania and into Kenya. It has generally been assumed that only one race existed throughout this wide distribution. The types of both sexes came from Delagoa Bay.

Rothschild & Jordan (1900 : 374) did however draw attention to the fact that specimens from tropical (German and British) East Africa had wider bands on fore and hind wings, both above and below, than individuals from Delagoa Bay. Aurivillius in " Seitz ", 1911, lists only one race and gives the range, as Delagoa Bay to Mombasa. Stichel (1939 : 438) and Peters (1952 : 51) mention only one race.

---

[1] In this paper, the current names for the following African countries have been adopted. Rhodesia (Southern Rhodesia), Zambia (Northern Rhodesia), Malawi (Nyasaland) and Tanzania (Tanganyika with Zanzibar)). The locality labels on the specimens have not been changed.

In my series of papers on the *Charaxes* of Kenya and Uganda (van Someren & Rogers, 1928. Pt. 8), I described and figured specimens from Mombasa, assuming that these could be taken as typical *violetta*. In a further reference to the species, (van Someren, 1935 : 185) I extended the range of the species northward to Meru, near Mt. Kenya.

In the course of correspondence with Dr. R. M. Fox of the Carnegie Museum, U.S.A., I was informed that he was describing a new race of *Ch. violetta* from the Nguru Hills, Tanzania, because specimens from that locality differed from those of Amani (Usambara foothills), Dar-es-Salaam and Mombasa, which he considered to be nominotypical *violetta*. I have since seen the published description in which he refers to my previous references to the species as quoted above. No reference or comparison was made with topotypical Delagoa Bay material, though I suggested this should be done before publication of his paper. A preliminary survey which I had carried out suggested that a detailed study of material from throughout the known range was essential to a reasonable appreciation of the degree of variation in the species.

First of all, it was necessary to have access to the types, which fortunately are preserved in the British Museum (Natural History). These specimens, a male and female, are still sufficiently well preserved to exhibit the salient characters. Other topotypical material seems difficult to trace and examine, but I have brought together five authentic females and four males and these exhibit a constancy of upperside characters, though rather variable below, which are described in detail hereafter, and depicted on Pl. 1, figs. 1–8.

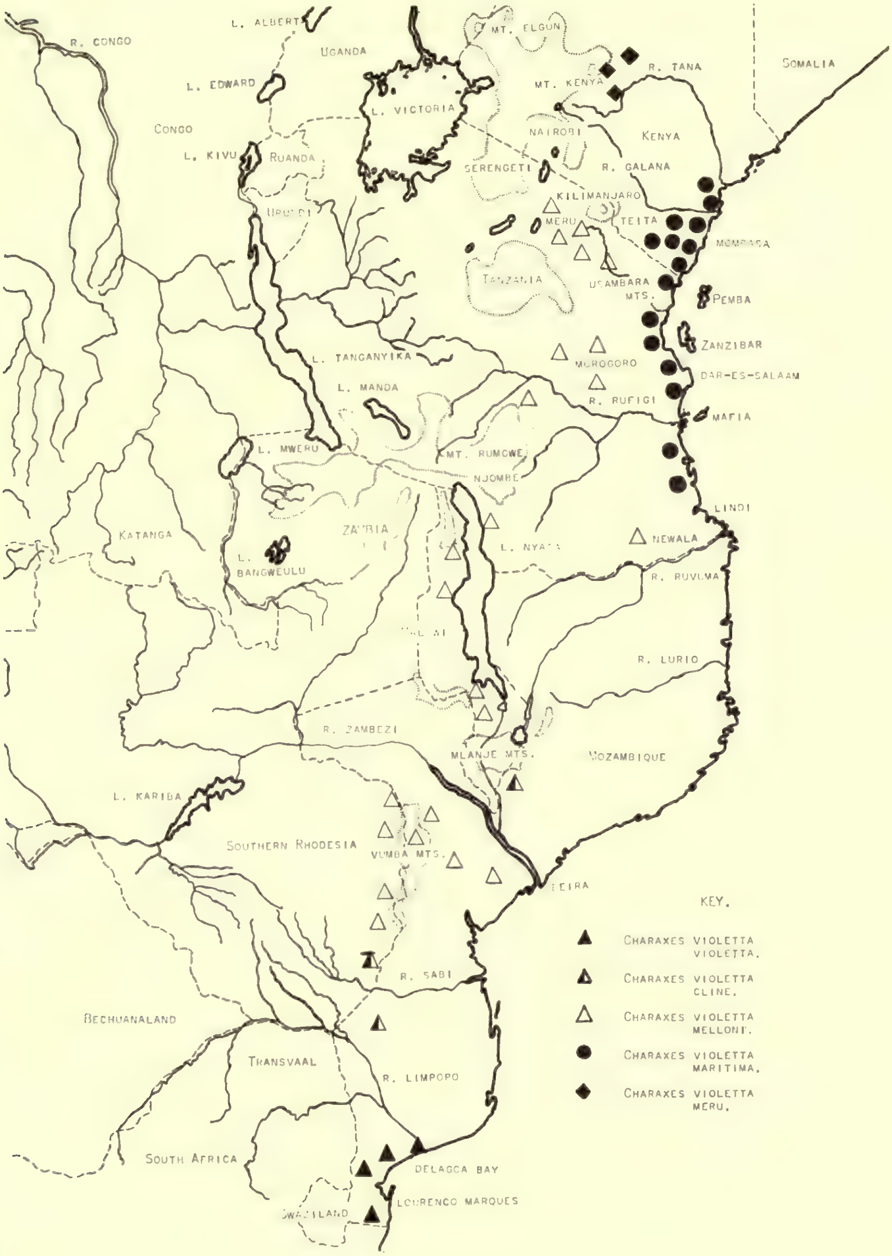
Through the kindness of various contributors I have assembled considerable series from eastern Rhodesia (Vumba to Selinda) ; from the Beira area of Mozambique (Dondo and Amatongas) ; from Malawi and the southern areas of Tanzania, north to Mt. Kilimanjaro, and also from the Usambaras and from the coast belt from Dar-es-Salaam to Mombasa and the coastal forests of Kenya, inland to the Teita Range and from the area N.E. of Mt. Kenya at Meru and the Njombeni hills.

This considerable material shows clearly that the observation made by Rothschild & Jordan in 1900 was correct, viz., that specimens from the northern tropical areas have considerably wider discal bars, above and below, especially in the females, than Delagoa Bay insects. Thus specimens from the extremes of the range are markedly different.

In order to obtain an overall picture of the species it is necessary to arrange the material in geographical sequence, starting in the south and working northwards and attempting to correlate the specimens with topography and ecological environment so far as it is known, using as a basis a standard topographical map and the Vegetation Map produced by UNESCO in 1958.

The line of distribution of *violetta* as exemplified by material under examination is shown on map A.

As a result of this arrangement, it is noted that *violetta*, apart from the two communities at the extremes of the range, presents a confusing picture, evidenced by instability of pattern in the female, particularly in regard to the width of the fore wing white bar and size of the hind wing patch and white bar below.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MT. ELGON
R. TANA
SOMALIA
MT. KENYA
L. EDWARD
L. VICTORIA
CONGO
NAIROBI
KENYA
L. KIVU
RUANDA
SERENGETI
R. GALANA
URUNDI
KILIMANJARO
MERU
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L. KARIBA
SOUTHERN RHODESIA
VUMBA MTS.
BEIRA
KEY.
▲ CHARAXES VIOLETTA VIOLETTA.
◭ CHARAXES VIOLETTA CLINE.
△ CHARAXES VIOLETTA MELLONI.
● CHARAXES VIOLETTA MARITIMA.
◆ CHARAXES VIOLETTA MERU.
R. SABI
BECHUANALAND
TRANSVAAL
R. LIMPOPO
SOUTH AFRICA
DELAGOA BAY
LOURENCO MARQUES
SWAZILAND

MAP A

Nevertheless, the overall pattern of specimens from Vumba northward to Malawi, the central area of Tanzania and to the western side of Mt. Kilimanjaro appears to present features suggesting a cline from nominotypical *violetta* of Delagoa Bay to the broad-banded, more stable races found in Kenya. Thus, in a long series from the area of Mt. Selinda, one or two may be narrow-banded ; similarly, specimens from the lower zones of Usambara may tend toward the broad-banded coastal Kenya race ; the majority being transitional.

It is often a matter of personal opinion as to whether such an aggregate is deserving of a subspecific name. As indicated previously, Dr. Fox has published the name *melloni*, applicable to specimens from the Nguru Mts. near Morogoro (Fox, 1963 : 222–224) but the female type is only one variation of this aggregate. It may be noted here, that *Charaxes violetta* is a species in which the black colour, especially in the females, tends to fade, assuming a brownish-black or brownish-purply colour in the dark areas above.

DESCRIPTIONS AND NOTES

Charaxes violetta violetta Grose-Smith

(Pl. 1, figs. 1–8 ; Pl. 2, figs. 10–12, 14–16 ; Pl. 3, figs. 17, 18 and 21)

Charaxes violetta Grose-Smith, 1885 : 247 [♂].
Charaxes violetta Grose-Smith & Kirby, vi.1887 : 1, pl. 1, figs. 1–3. [♂, ♀].

MALE : Fore wing length 37–38 mm. *Upperside.* Ground colour of fore wing strongly blue-black with slightly more greeny-blue sheen at base ; base of costa brown. Discal spots blue ; streak on costa often whitish ; mark below costa a streak at end of cell followed by larger ovate spots at bases of 4–5, a larger spot sub-basal in 3, a larger spot in 2, that in 1b more quadrate and contiguous with post-discal mark in same area ; a longer blue streak in 1a often extending inward proximad. Post-discal spots : two subapical white, upper one more distinct, remainder blue, those in 5–4 often vestigial, that in 3 more distinct, the spot in 1b larger and touching the discal spot, the longer mark in 1a variable. Margin of wing slightly incised, with slight indication of internervular whitish spots sometimes present in areas 2–4. Hind wing basal area and border blue-black, disc of wing with large blue patch whitish toward centre and at junction with ashy-grey of inner fold, not extending through to costa but represented by one or two discrete spots in 6 and 7. Dark border with row of small bluish spots, double at anal angle ; margin with line of bluish lunate marks whitish at veins. Tails shortish, tapering rapidly, upper 5 mm., lower 3 mm. ; margin of wing slightly serrate. *Underside.* Fore wing basal area olive-ochre, followed by a broad darker olive discal band accentuated in narrow white and black ; distad to this a paler bar similar in colour to the wide distal border with a darker triangular patch between ; double tornal spot with a smaller one above usually well marked, internally bordered with crescentic olive-ochre accentuated proximally by black. Black lines at base rather faint or thin. Hind wing ground colour olive-ochre, with a darker olive discal band outlined narrowly in black and white, followed by a paler zone which is contiguous with an irregular darker olive post-discal zigzag line ; border olive-ochre carrying submarginal spots, distinct or obscured, whitish and violet in colour ; marginal lunate marks whitish, distinct in lower half, indistinct towards upper angle.

Variation. In some specimens the underside pattern is in greater contrast, the distal borders of the wings being much paler than the basal dark areas ; the whitish discal lines on both wings broader and more distinct.

FEMALE. Fore wing length 40–45 mm. *Upperside.* Base of wing blackish-brown with some purply-blue sheen in side light ; apical half of wing blacker ; discal curved white band extends from the costa to hind border, passing through bases of 5–6, sub-basal in 4, slightly off-centre in 3–2, the mark in 1b indented on both ends, shorter than the mark above proximad, followed by a longer streak in 1a ; the last two marks with some violet-blue scaling at ends. The white mark on the costa extends proximad beyond the next mark. The band is narrow at end of cell, about 4–5 mm. wide, slightly broader in 5, the longest mark in 2 ; the outer border of the bar is thus more curved than the inner. The post-discal spots in subapex usually limited to two, the upper elongate, the lower smaller and more round. Hind wing basal area brownish-black ; distal border blacker ; the disc of the wing with a dull violet-blue patch rather dyslegnic on inner border, but more clear cut on outer edge ; crossed in the discal line by a whitish bar which runs toward but does not reach the inner fold ; the outer border of the patch irregular in its upper half. The black border carries a complete row of white elongate spots which are tinged with violet ; admarginal line of lunate marks lilac and white. Tails thin and tapering, upper 6 mm., lower 3 mm. *Underside.* Fore wing basal triangle olive-grey, crossed by black lines, proximally edged in white it becomes darker where it abuts on the white discal band, which is a replica of the upperside, but marks in 1a–1b are more clear-cut. Beyond this, a dark olive-brown triangular patch fills the area between the upper distal edge of the bar and the distal border of the wing ; the two post-discal subapical spots are white, followed by large indistinct golden-olive marks bordered distally with lilac scaling, culminating in the double black tornal spot in 1b with a smaller spot above. The outer border of the wing is slightly satiny. Hind wing basal triangle olive-greyish, bordered distally by an almost straight whitish line in the upper half, then shading darker to the discal white bar, which runs from the costa to above the anal angle, slightly expanded on the outer border at about mid-point ; this is followed by a dark satiny zone which narrows above the anal angle and becomes paler in the submarginal area carrying a series of obscure lunate lilac marks with black at the veins, accentuated toward the anal angle, where the double black marks are strong ; margin with indistinct lunate olive-ochre marks.

Four other topotypical females agree in having the fore wing white bar considerably narrower than in the type specimen, more particularly in the posterior half of it, so that the bar is almost parallel-sided and there is a decided kink on the proximal side in 1b. As in the type, the hind wing patch is restricted on the proximal side.

Range : My investigations suggest that the nominate form of *violetta* is restricted to Laurenço Marques and the area of Delagoa Bay, and slightly northward in the coastal forest zone. It does not extend directly westward into the Transvaal, but occurs on the east side of Rhodesia in the region of the Vumba Mts. in a slightly different form, described hereafter.

Charaxes violetta transitional form

(Pl. 2, figs. 9 and 13)

MALE. Fore wing length 40 mm. *Upperside.* Ground colour blue-black with slight greeny sheen at base. Discal row of spots blue, the spot in 1b rather quadrate, the streak in 1a slightly longer ; the post-discal spots in the subapex white, the remainder blue, the spots in 4–5 missing. (In this respect the fore wing is similar to the nominate form.) Hind wing similar to nominate, but discal patch may be slightly extended toward base. The majority of males however differ as follows : the fore wing discal spots are stronger and the post-discal series complete, the blue marks in 1a–1b larger ; the discal patch in hind wing larger and less strongly blue. (Pl. 2, fig. 9.)

FEMALE. *Upperside.* Fore wing basal area not so black as nominate or may be considerably paler ; discal band narrow in area beyond cell but expanding gradually and widest toward the hind margin. Hind wing discal patch larger and extended basad, usually carried up to costa, paler and not so blue on borders. *Underside.* Somewhat variable. (Pl. 2, fig. 13.)

The species is plentiful in the area inland from Beira in the Dundo-Amatongas and extends northward into Malawi, thence to the Southern Highlands of Tanzania. This aggregate exhibits a fair degree of stability of characters tending towards, but by no means identical with, nominate *violetta*. (Mlange to N. Malawi.)

We now consider specimens from Tanzania : Newala, Iringa, Morogoro area, the higher zones of the Usambara Mts, and the area west of Kilimanjaro (Arusha-Meru). It is from amongst this aggregate that the name *melloni* was applied to specimens from Nguru, Morogoro district, because these differed from examples from the coast line. Dr. Fox presumed that *melloni* represented a localized breeding community, but in actual fact his specimens represented one variation (and was represented by only one female) of a somewhat variable aggregate. (cf. Pl. 2–4, particularly type of female *melloni* and Pl. 2, fig. 16, Kimboza forest.)

It will be noted that although the aggregate exhibits features common to the majority, some tend toward the Malawi and some toward the coastal forms. Thus the name *melloni* Fox (1963 : 222) is applicable to a form within this unstable aggregate.

Charaxes violetta maritima ssp. n.

(Pl. 3, figs. 19 and 20, 22–24)

Specimens of *Charaxes violetta* from the Kenya Coast differ markedly from examples of nominate *violetta* from Delagoa Bay (cf. Pl. 2, figs. 1 and 2) more particularly in the case of the female sex. This fact had already been noted by Rothschild & Jordan in 1900, but Kenya examples have been lumped with nominate *violetta* even to the present day, due no doubt to the confusing picture given by representatives of the species in the intermediate areas of its range.

MALE. Fore wing length 36 mm. *Upperside.* Ground colour blue-black with slight greeny sheen at base ; discal spots not extending to costa, strongly blue, slightly paler in 1b and longer streak in 1a ; post-discal spots : two subapical white, remaining spots of increasing size from 5 to 1b where the mark is contiguous with the discal mark ; margin of wing with very small obscure internervular blue dots. Hind wing base black ; border black ; disc of wing with largish patch strongly blue scaled on outer border, slightly less so on inner, more whitish in discal line, represented toward costa by an elongate blue mark and by two spots at subcosta. Black border with submarginal bluish-white spots double at anal angle ; margin with rather divided bluish-white lunules ; fringe very slightly white between veins. *Underside.* Ground colour rather darker than nominate race but pattern similar though white lines narrower but clear cut.

FEMALE. Fore wing length 44 mm. *Upperside.* Base of wing brownish-black shading blacker distally, the junction of the black with the discal band rather dyslegnic. Discal white band very broad, commencing at the costa as a long streak extending basad, from then on the band widens very considerably and is 15 mm. broad at hind margin, the broadening of the band distad toward the tornus thus encroaches on the distal half of the wing, so that the post-discal spots, which are white in subapex and then bluish, stop in 3. Hind wing, basal brownish-black area very restricted, merging rapidly into the very broad discal patch, which is largely whitish with a slight bluish tinge proximally and very slightly on distal border ; the patch usually runs right through to the costa as in the type, or it may be more strongly represented by the large quadrate white spot in the discal line, as in Pl. 3, fig. 22. The black border carries a row of submarginal bluish-white spots; the margin a series of irregular lunate bluish-white marks up to 6. Tails, upper 5 mm., lower 3 mm. *Underside.* Ground colour rather paler than in other races, a lighter olive-brownish; the black marks show up strongly in the basal area of the fore wing and at tornus. The white bar broad as above; the post-discal whitish spots other than the two subapical rather indistinct. Hind wing ground colour paler, the basal area not so strongly defined from the white discal bar, which is broad and the post-discal zigzag dark line not so heavy; the lunate marginal marks well marked.

Holotype male. KENYA: Rabai Hills, vii.1922 (*van Someren*).

Allotype female. KENYA: Rabai Hills, v.1928 (*van Someren*).

This is a smallish race and remarkably constant, the chief variation being in the intensity of the fore wing basal area and the degree of bluish suffusion on the proximal side of the hind wing patch.

This subspecies has been bred in considerable numbers on *Afzelia cuanzensis* Welw. (Caesalpinaceae) and *Brachystegia* (*edulis* Burtt Davy & Hutch.) *spiciformis* Benth, but mainly on the former.

Range: This race has its chief locus in the forests of the Kenya Coast belt: Rabai Hills, Shimba Hills, Sekoke-Arabuko forest and it extends inland to the Teita Hills. It also occurs in the forests of the Shimoni-Vanga area, and in the Tanga-Dar-es-Salaam (Pugu forest) areas. There is some indication of variation in the lower forests of the Usambara Range at Amani (Pl. 3, fig. 24).

How far the species goes along the Sabaki and Tana Rivers gallery forest is not known, but there appears to be a considerable break between the race *maritima* and that described hereafter.

Charaxes violetta meru ssp. n.

(Pl. 4, figs. 25 and 26, 29 and 30)

This subspecies is considerably larger than the race *maritima* and because of its rather isolated position has evolved characters which entitle it to subspecific rank.

There is a certain superficial resemblance between this race and the aggregate from Tanzania, but whereas these latter are unstable, the race *meru* is very stable and has no contact with this cline, to which the name *melloni* has been applied.

MALE. Fore wing length 40–43 mm. *Upperside.* Ground colour blue-black with strong greeny-blue sheen at base of wing in side light. Pattern very similar to *maritima* but discal and post-discal blue spots more distinct; the marginal internervular white spots more distinct. The rather variable blue marks in 1a–1b conjoined with the post-discal. Hind wing discal patch larger and less blue, with a more pronounced white discal zone. *Underside.* As in the other subspecies, and very similar to *maritima* but white line on fore and hind wings rather broader; tails shorter and more robust, upper 4 mm., lower 2 mm.

FEMALE. Fore wing length 45–47 mm., thus larger than *maritima*. *Upperside.* Pattern generally similar, but base of fore wing rather darker, the white bar broad, but considerably narrower in subcosta at end of cell but widening appreciably in 3 then more gradually to hind margin where it expands proximally and distad in 1a–1b. The hind wing patch margin with distinct internervular white spots is large, extending basad and merging into the basal dark area, the inner border suffused with violet-blue scaling ; the outer border clear cut and tinged with violet-blue but crossed by a distinct white discal bar which extends to above anal angle ; marginal border black with complete row of submarginal bluish-white spots ; the margin with distinct whitish or bluish-white lunules ; fringe whitish between veins. Tails moderately long, upper 7 mm., lower 4 mm. *Underside.* Generally darker than in *maritima* with white bars more in contrast. In the fore wing the post-discal and submarginal spots more distinct, though the tornal black spots tend to be smaller. On the hind wing the zigzag dark line is strong and the submarginal spots are more distinct.

Holotype male. KENYA : Meru, N.E. of Mt. Kenya. British Museum (N.H.). (*M. S. Berkeley*).

Allotype female. KENYA : Meru, near Mt. Kenya. xi.1935. British Museum (N.H.).

Range : The only areas from which this race has been recorded are Meru, north-east of Mt. Kenya in both the upper and lower forests, and further north-east in the Njombeni Hills.

SYSTEMATIC LIST

Charaxes violetta Grose-Smith

Charaxes violetta violetta Grose-Smith, 1885. Type locality : Delagoa Bay, Mozambique. Range : Restricted to the southern end of Mozambique in the Delagoa Bay, Laurenço Marques region.

A cline toward the Malawi aggregate ; some tendency toward nominate in southern zones. Range : Eastern boundary of Rhodesia from Mt. Selinda northwards along the Vumba Range.

A cline in the Malawi area, Mlange, north up the west side of Lake Nyasa intergrading into the mixed aggregate of southern and east-central Tanzania to western foothills of Kilimanjaro.

As *melloni* Fox, 1963. Type locality : Nguru Hills north of Morogoro, Tanzania.

maritima ssp.n. Type locality : Rabai Hills, Kenya Coast zone. Range : The coastal strip of N.E. Tanzania (Dar-es-Salaam, Tanga), Kenya Coast forests ; Shimba Hills, Sekoke-Arabuko forest, Ganda Forest to Lamu ; also at Taveta.

meru ssp. n. Type locality : Lower Meru Forest, Mt. Kenya. Range : The lower forests on eastern side Mt. Kenya, Meru, also Njombeni Hills.

2. THE *CHARAXES ETESIPE-PENRICEI* COMPLEX

Rothschild & Jordan reviewed the members of this complex in 1900, treating *etesipe etesipe* as a nominate race with a distribution from West Africa to Uganda, *etesipe abyssinicus* as the Ethiopian race, *e. tavetensis* as the East African race, *e. cacuthis* as an insular race from Madagascar, and *Charaxes penricei* as a distinct species from Angola.

During the past fifty years much additional material and information has accumulated; Lathy described *etesipe paradoxa* from the Comoro Islands in 1925, Joicey & Talbot (1922) published the description of *penricei dealbata* from Portuguese Congo, and other races and forms were added subsequently.

The last general review of the complex was by the late Professor Hale Carpenter (1947). This elaborate paper was concerned mainly with the males of the species comprising the group. Having dealt first of all with the named species and races listed up to that time, and indicated their distribution, he provided a map showing their respective ranges. This map gives the general impression that there is a very considerable overlap of *penricei* and *tavetensis*, but in a footnote Carpenter states " the alternating position of the names *tavetensis* and *penricei* . . . in Rhodesia and south-eastern Congo, must not be taken to indicate *details* of distribution only the general occurrence in the same area ". This map was based presumably on records and on actual specimens and I shall return to this point later on.

Having reviewed the original references to members of this complex, Carpenter selects certain points in the fore wing pattern and the general underside coloration to demonstrate the relationship or divergence, one to the other. He takes the width and position of the blue band at vein 1 and furnishes a table of percentage values, and a statistical analysis of this data; later on the character and position of the hind wing band is discussed. The arrangement of Table 1 (Carpenter, 1947 : 95) suggests that there are three species in this complex: *etesipe* with three subspecies, *penricei* with two, and *cacuthis*. It would appear that this division is based on the following: (A) the evidence of measurements given in the table. (B) the apparent overlap of *penricei* and *etesipe tavetensis*. (C) the present isolation of *cacuthis* and the distinctive character of its female. In my view these data are inconclusive.

A new approach, aimed at elucidating the relationship of members of this complex, has been proposed by Dr. G. van Son (*in lit.*). Having found that the antenna-wing ratio was of value in separating very similar species of Satyrines, he suggested that a series of antenna-wing measurements might throw light on the *etesipe-penricei* problem. I accordingly submitted a small representative series of specimens to him. The resultant ratios proved of considerable interest and were as follows:

Table I

Ch. penricei penricei	♂, 0·417, 0·418, 0·420, 0·416, 0·420
(Mumbwa, Zambia)	♀, 0·376, 0·376, 0·374
etesipe etesipe	♂, 0·401, 0·402, 0·400, 0·400
(Uganda)	♀, 0·337, 0·336, 0·336
e. tavetensis	♂, 0·438, 0·436, 0·440, 0·443, 0·436
(Kenya, Coast)	♀, 0·355, 0·357, 0·356
e. abyssinicus	♂, 0·427, 0·427
(Gimma, Ethiopia)	
ssp. n.	♂, 0·414, 0·416, 0·413, 0·412, 0·413
(W. Tanzania)	♂, 0·412, 0·414 (No females sent.)

These data were submitted to Dr. C. B. Cottrell for analysis with the results shown in Table II.

TABLE II

	penricei	*e. etesipe*	*e. tavetensis*	*e. abyssinicus*	*e.* ssp. n.
No. in sample, males only . .	6	4	6	2	7
Observed range .	0·416–420	0·400–402	0·436–445	0·427	0·412–416
Mean . . .	0·4185	0·4008	0·4388	0·427	0·4134
Standard deviation .	0·0017	0·0010	0·0027	—	0·0025
Standard error .	0·0009	0·0005	0·0011	—	0·0009
Coefficient of variation . .	0·41	0·13	0·60	—	0·60

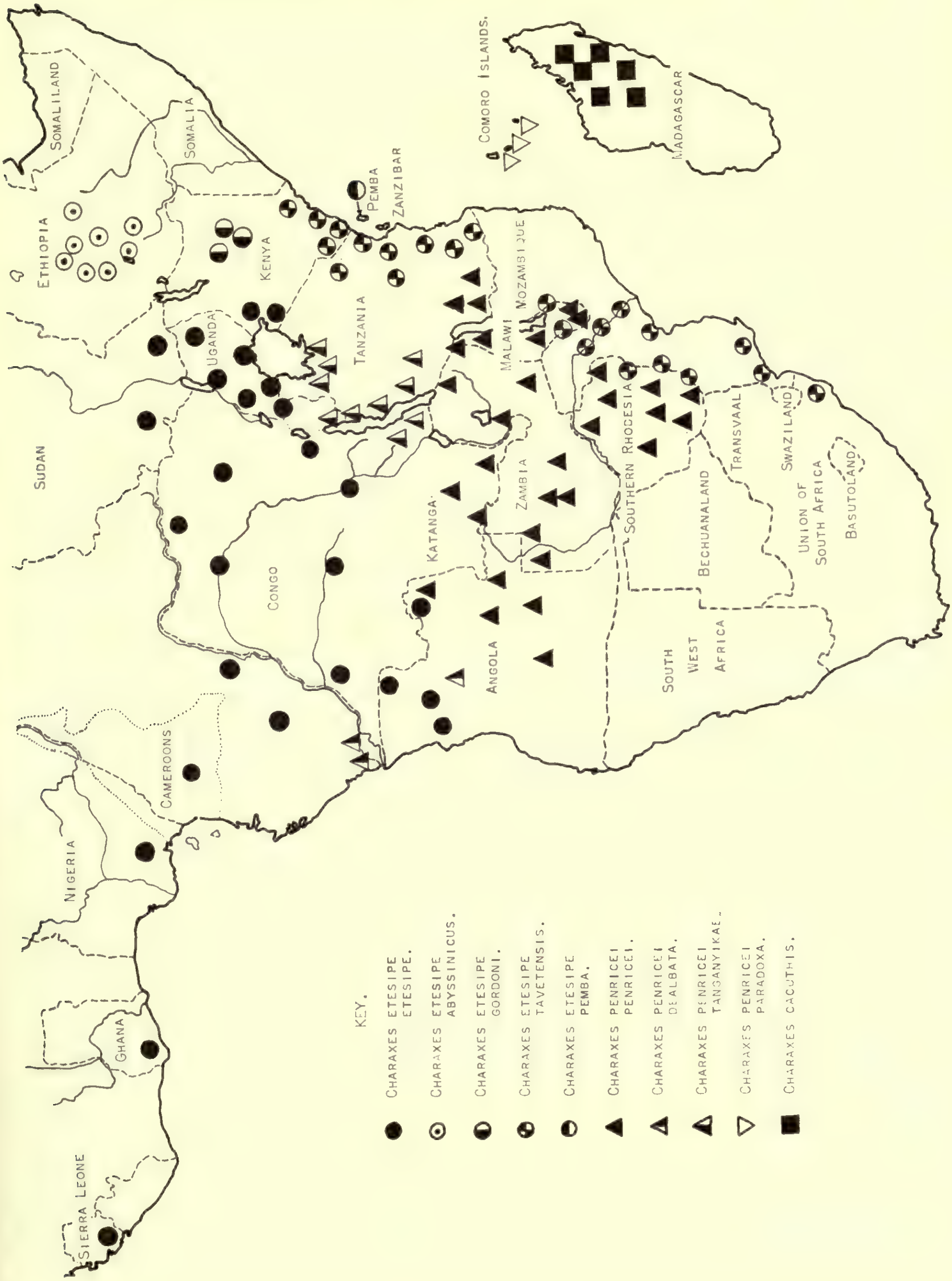
Dr. van Son (*in lit.*) suggests that each member of this complex should be rated as a species. In my opinion, it would be rash to evaluate the antenna-wing ratio to the degree suggested by Dr. van Son. It is however possible that these figures may throw some light on the relationship of two or more entities in the group, on a subspecific plane. It will be noted that :

1. The data for the new subspecies come nearer to *penricei* than any other. The large spots in fore wing are those of *penricei* ; the hind wing band is more proximad than in *tavetensis*.
2. *etesipe etesipe* and *penricei* show a wide divergence in ratios and their general pattern and appearance are different.
3. *etesipe etesipe* and *e. tavetensis* show the greatest difference in antenna-wing ratios, but in upper side pattern they are not very widely different.
4. *e. abyssinicus* is intermediate between *etesipe etesipe* and *e. tavetensis* and the upperside pattern inclines toward the former.

I think this aspect of the problem should be looked into further.

I am unable to accept, in their entirety, the views expressed by Carpenter (1947). In order to check his data, I have brought together a very considerable amount of material covering the entire known range of the insects involved and I have examined types where possible or photographs of them and topotypes in all cases. In addition I have examined the actual specimens " doubtfully " allocated by Carpenter, such as those mentioned on page 96 and 102 of his review.

It is well known that in many groups of nymphalid butterflies, the underside pattern (and not necessarily the coloration) is diagnostic of the species. On this basis, it would seem probable that in the distant past before Africa was subjected to vast changes in vegetational coverage, *etesipe* and *penricei* had a common ancestor. Changes in topography and the elimination and separation of forest areas which we know took place, caused a splitting up of this ancestral stock, the *etesipe* stock remaining in the still well-forested areas to the north and the stock which gave rise to *penricei* adapted itself to sparsely wooded and savanna types of country. There is evidence suggesting that the *penricei* stock extended from west to east, well south of the Equator, at a period prior to the complete separation of Madagascar and the Comoros from the mainland of Africa. There is also some evidence suggesting that at a later date, the *etesipe* stock and that of *penricei* spread, converged, but have not interbred ; that *etesipe*, in the form of race *tavetensis*, is a comparatively recent


Somaliland
Somalia
Ethiopia
Sudan
Kenya
Uganda
Tanzania
Pemba
Zanzibar
Comoro Islands.
Madagascar
Mozambique
Malawi
Zambia
Katanga
Congo
Angola
Southern Rhodesia
Bechuanaland
Transvaal
Swaziland
Basutoland
Union of South Africa
South West Africa
Cameroons
Nigeria
Ghana
Sierra Leone
Key.
● Charaxes etesipe etesipe.
⊙ Charaxes etesipe abyssinicus.
◒ Charaxes etesipe gordoni.
⊕ Charaxes etesipe tavetensis.
◐ Charaxes etesipe pemba.
▲ Charaxes penricei penricei.
◁ Charaxes penricei dealbata.
◭ Charaxes penricei tanganyikae.
▷ Charaxes penricei paradoxa.
■ Charaxes cacuthis.

MAP B

invader of the once *penricei* territory, following the establishment of coastal forest belts and gallery forests down the east coast, thus creating suitable environment for *etesipe* stock. On the other hand, the *penricei* stock on the Comoros and Madagascar, by prior complete isolation, evolved into insular entities which can now be considered species.

Viewing the complex as we see it today, Rothschild & Jordan were right in considering *penricei* to be a species distinct from *etesipe*, but it is difficult to understand why they considered *cacuthis* to be a subspecies of the latter. Carpenter supports the view that *cacuthis* is a species.

When the distribution of the various elements of this complex are mapped out in some detail (vide map B), it would appear at first sight that each represented a replacement subspecies of a single species, but with one or two exceptions, viz. *dealbata* and *etesipe* in N.W. Angola, and the apparent overlap of *penricei* and *etesipe tavetensis* in S. Tanzania, S. Malawi and eastern Rhodesia.

According to Carpenter's map, the overlap was considerable in some areas, but some of this apparent intermingling is due to misplacing of some specimens. There would appear to be a definite territorial overlap of *etesipe etesipe* and *penricei dealbata* in N.W. Angola. The latter was described from two males taken at Kibikolo do Zombo in Portuguese Congo (north of the mouth of the Congo River) and one male from Pungo Andongo in N.W. Angola. It would seem that *etesipe* cuts across between these two localities for I have examined specimens of nominate *etesipe* from Luanda and the Congo Prov. of Angola.

Other areas of overlap were suggested by Carpenter (1947 : 102) ; it is stated that *penricei* and *tavetensis* both occurred at Geita in the Biharamulo district of Tanzania to the south-west of Lake Victoria. I have examined these specimens and they are examples of a race of *penricei* which are described later. Neither nominate *etesipe* nor *tavetensis* seem to occur directly south of Lake Victoria, but the former does extend to the eastern shore of the lake.

The records of *tavetensis* apparently overlapping with *penricei* in Zambia, Malawi and the eastern side of Rhodesia, require careful investigation in the light of ecological preference displayed by these species. In the main, *penricei* is an insect of savanna, whereas *etesipe* is an insect of forest in bulk or gallery forest. These habitats may be defined and clearly separate or they may merge where savanna gives way to forest ; or savanna country may be traversed by rivers with fringing forest. Although there is this apparent overlap of distribution when depicted on a small scale map, I can obtain no evidence from correspondents that the two insects fly together in the same spot and might be taken in the same trap! Unfortunately the majority of data labels fail to give information regarding ecological environment.

Some specimens I have examined were erroneously placed to *tavetensis* or even *dealbata*, but they are in my opinion varieties of male *penricei* with a strong blue suffusion over the lower fore wing spots and over the hind wing band ; the fore wing spots are large as in nominate *penricei*, the hind wing band is discal or partly discal, *not* post-discal. Such examples are from Songea in S. Tanzania, Chintechi in Malawi, Mumbwa in Zambia, Lundi in Rhodesia and south-east Katanga.

Carpenter (1947 : 99) deals very briefly with the female forms, and in his summing-up states " it is, in my opinion, almost impossible to say which females are *tavetensis* and which *penricei* when taken in Nyasaland where the two overlap ". But do they really overlap? The antenna-wing ratio should be of assistance (vide Tables I and II). Females of nominate *penricei* have the pattern dead white, suffused with some blue (with the exception of ab. *flavus* Lathy) ; in *tavetensis*, the fore wing pattern is creamy.

It is generally assumed that the male genitalia in this complex exhibit no real structural differences, except perhaps in the case of *cacuthis* (Carpenter, 1947 : 98, text-figures).

The foregoing remarks will have indicated the difficulties encountered in attempting to unravel this complex. I have quoted at length the diverse views on the problem which have appeared in print and given my views on them.

The following section will provide a brief description of the species, subspecies and forms, which come within this complex.

DESCRIPTIONS AND NOTES

Charaxes etesipe etesipe (Godart)

(Pl. 4, figs. 28 and 32 ; Pl. 5, figs. 33–35 and 37–39)

Nymphalis etesipe Godart, 1824 : 355 [♀].
Nymphalis etheta Godart, 1824 : 356 [♂].

Nominate examples from Sierra Leone are, on the whole, rather smaller than specimens from the eastern Congo and Uganda ; this applies more to the female sex, but there appears to be complete gradation between the extremes.

MALE. Fore wing length 36–40 mm. *Upperside.* Ground colour blue-black (more brownish-black in old specimens) with a greenish lustre more pronounced toward the base of the wing. Pattern as follows : a crescentic white spot toward the end of the cell, followed by a large white spot sub-basal in 6 with a small spot below in 5 often vestigial ; large spots sub-basal in 3–2 in discal line ; complete series of post-discal spots : two spots in line in 7–6, spot in 5 set in slightly, small or vestigial ; larger spots in 4–3, all upper spots whitish ; spots in 2 to hind margin larger, and bluish, spot in 1b double. These post-discal spots follow the contour of the wing margin, which carries a complete series of blue marks increasing in size from 7 to 1b, where the mark is double. Hind wing ground colour blue-black ; subcostal white mark in discal line usually present or may be vestigial ; a post-discal series of conspicuous blue spots from 6 to anal angle, beyond a series of submarginal white spots, double at anal angle, but spot in 5 very small ; margin above upper tail reddish or maroon, the crescentic marks to anal angle greenish. The outer margin of the wing is characteristic, having a pronounced projection at the base of the upper tail and a rounded projection at anal angle below lower tail. *Underside.* The pattern is characteristic and highly complicated and is well depicted on the accompanying plates. Ground colour of the fore wing cell whitish to cream crossed by three reddish bars outlined in black ; reddish bars cross the sub-bases of 1b–3 ; the discal and post-discal spots of above, here represented by larger greenish-white marks distally and proximally accentuated by black marks, large and double at tornus ; distal portion of wing greyish or greyish-brown incised by two triangular creamy marks, base to margin, the lower along vein 4, the upper along vein 7 ; the submargin with a fine black line ; margin black. Hind wing ground colour greyish olive ; costa conspicuously creamy-white from base to post-discal line ; with a quadrate white spot below in discal line ; basal bars reddish-brown, followed by two elongate white marks in the cell ; the discal line with whitish spots ; post-discal black dots in double row, large on upper part of inner line, small on outer ; submargin with line of whitish linear marks, large at base of upper tail and at anal angle, accentuated by a triangular black mark at base of upper tail ; margin reddish above upper tail, greenish toward anal angle.

Variation. Males from Uganda, besides being larger on an average, have the upper fore wing spots conspicuously white ; the margin of the wing with conspicuous internervular glaucous marks ; the costal spot on the hind wing may be absent, small or double ; the post-discal line of blue contiguous spots small, and the bar narrow, or the spots large.

FEMALE. Fore wing length 40–42 mm. in topotypical specimens. *Upperside.* The original description of the type of the species is reasonably accurate but states that the ground colour is blue-black and the oblique bands crossing fore and hind wings are white, no mention being made of the shading to the borders of the hind wing band. In specimens I have seen, the ground colour is brownish-black with a strong greenish-blue sheen when fresh, the distal half of the wing blacker. The pattern of the fore wing is basically that of the male but modified : the spot in the cell is small or often absent and the spots beyond may be four or reduced to one subcostal and one in 3. The post-discal or discocellular bar is well marked and inclined discally in hind portion ; the three subapical spots are small, the others increasing in size on the proximal side so that the band in 1a is in line with the costal mark in the hind wing. The colour of the bar is seldom white and is usually creamy or even yellowish tinged. The marginal marks are limited to a few in fringe between the veins. The hind wing bar varies somewhat in width and extent toward the anal angle ; it is well marked at the costa, slightly narrower in the space below, then of more even width but tapering above anal angle at inner fold. The band is whitish or yellowish white with a varying amount of bluish or greeny-bluish scaling on the borders. The submarginal line of spots may be complete, or absent above upper tail, and whitish in colour ; the margin above the upper tail is dark reddish, then strongly black at base of tails, then greenish to anal angle. *Underside.* Pattern somewhat as in the male, but the discal band more clearly indicated and wider with, on the distal side, a complete row of submarginal black marks of increasing size, largest and double at the tornus ; then follows a thin blackish admarginal line ; marginal border greenish buff. Hind wing pattern as in the male, but subcostal mark larger and the light discal bar of above may be slightly indicated by creamy interspaces between the reddish bars in the base and the black post-discal spots ; border as in the male but marks accentuated.

Variation. I have examined one specimen from Calabar, Nigeria, in which the spots of the fore wing post-discal line are well separated and blue-tinged except for the subapical spots ; the hind wing band is strongly suffused with blue. This variety would appear to be analagous to form *caeruleotincta* Carpenter which occurs amongst the Uganda aggregate. This specimen bears a strong likeness to male *Ch. penricei dealbata* Joicey & Talbot or even to the blue variant of male *penricei* and should not be confused with either (Pl. 5, fig. 38). Mr. R. G. T. St. Leger, of Enugo, Nigeria, is of the opinion that the creamy-yellow and bluish barred female forms are seasonal.

Charaxes etesipe : Eastern Uganda aggregate

As already mentioned, specimens of *etesipe*, especially the females, tend to be considerably larger than nominate Sierra Leone examples. The majority of males have a fore wing length of 42 mm. There is already a tendency in many examples toward a widening of the blue band in the post-discal zone of the hind wing (Pl. 5, fig. 33).

Females are more variable and are consistently larger, not infrequently with fore wings of 58–60 mm. Though of very considerable expanse, the oblique bars on the fore wing and hind wing tend to be generally narrower throughout, because there is not the abrupt difference in length of the spots in 4 toward the hind margin, and the discal spots in 2–3 are narrow and not much shorter than those in 1a–1b ; the marginal spots are very small and may be represented only by those of 6–7.

Variation. (a) The form *caeruleotincta* Carpenter has already been referred to and so far, has only been taken in the region around Entebbe ; (b) a form in which the fore wing bar is almost white, that of the hind wing white with strong blue borders and tapering rapidly toward the inner margin ; (c) a form in which the fore wing bar is creamy yellow, the hind wing band creamy-yellow with greeny-blue suffusion on the borders ; (d) the form *castoroides* Poulton (1926 : 549), in which the cell spot in fore wing is orange, the discal spots ochreous and the fore wing bar strongly orange-ochreous, as is also the hind wing band except for the costal spot and one below which are white. In all these forms there is a tendency for suppression of the submarginal white marks above the upper tail to upper angle and lack of a green border between the tails but the anal lobe is margined with greeny-ochre or green.

Range : The nominate race ranges from Sierra Leone to Nigeria and the Cameroons and northern Angola through the Congo Republic to southern Sudan ; in slightly larger form in Uganda and in Kavirondo in north-west Kenya. The nominate form is also recorded from Upembe in Katanga. To the south of Lake Victoria and the eastern side of Lake Tanganyika *etesipe* overlaps with, but is replaced by a race of *penricei.*

The Uganda form of *etesipe* has been bred in numbers on *Ricinus communis* and *Phyllanthus* sp. (Euphorbiaceae).

Charaxes etesipe abyssinicus Rothschild

(Pl. 5, figs. 36 and 40)

Charaxes etesipe abyssinicus Rothschild in Rothschild & Jordan, 1900 : 458.

In the original description this Abyssinian race was contrasted with *e. tavetensis* from which it differs very considerably ; it however resembles nominate *etesipe* fairly closely on the upper side.

MALE. Fore wing length 40–42 mm. *Upperside.* Ground colour blue-black with a strong blue sheen at bases of wings. Pattern of fore wing as in nominate race, but post-discal spots in 1a–2 slightly larger and more strongly blue or violet-blue. Hind wing pattern as in the nominate form, but subcostal spot usually blue and the post-discal series of spots larger and more contiguous so that the band is wider and in this respect resembles the wide-banded males of the Uganda strain, the colour is however more intensely dark blue or violet-blue, cf. Pl. 5, fig. 36. *Underside.* The pattern is generally similar to that of the nominate race but the ground colour is darker, more chocolate-brown, and the bars at the bases of the wings a deeper chestnut red-brown ; the black lines and spots generally heavier.

FEMALE. This sex was unknown to Rothschild & Jordan and remained so when Aurivillius (1911) dealt with the species. It is not mentioned by Carpenter (1947). The first full description appears to be that by Ungemach (1932 : 53), a translation of which follows :

On the fore wing the discal band is pure white and broad, on 1b 8–9 mm. This continues toward the costal border in a series of round spots, white in spaces 4–8. Two similar spots of the same size, 1–2 mm. are present between the cell and the median line in 3–4. There is a straight brownish-grey marginal band which contains, toward the apex, some minute white dots. The median band which continues into the hind wing is at first, in space 7 also pure white but is tinged with blue in space 6 ; from there to the anal angle the band is 12–14 mm. broad. The underside markings show through in a bluish tint, and the whole of the distal half containing several acute-angled spots between the veins, is blue. The marginal spots in 1c and the marginal line up to space 4 are also bluish. The underside of both sexes (pattern) is similar to *etesipe*, but the shade of the ground colour is very different . . . reddish-brown instead of olive-green.

Through the kindness of Dr. G. Bernardi, of the Paris Museum I am able to give a photograph of a female taken by Ungemach (Pl. 5, fig. 40).

Range : This subspecies is found mainly in the high country to the west of the Abyssinian Rift. Ungemach records it from Youbdo and Tchella and I have examples from Gimma and Adola. Specimens from the southern Sudan that I have examined do not appear to differ from Uganda material, though Carpenter thought them to be " transitional " towards *abyssinicus*.

Charaxes etesipe patrizii Storace

Charaxes etesipe patrizii Storace, 1949 : 21.

This race was founded on one male specimen from Somalia and is characterized by its small size, the length of the fore wing being 36·5 mm. Its validity can only be established by the examination of more material.

Charaxes etesipe tavetensis Rothschild

(Pl. 6, figs. 41, 42, 45, 46)

Charaxes tavetensis Rothschild 1894 : 535.
Charaxes etesipe tavetensis Rothschild & Jordan, 1900 : 458.

The type is a very damaged male captured in the Taveta district, Kenya. Rothschild & Jordan associated with it three females from Dar-es-Salaam, Tanzania, and a male from Zomba, Malawi. This race is now known to extend down the east coast to as far as N. Zululand. Some of the records given by Carpenter (1947) from more inland areas such as the central block of Zambia, Katanga, and the south shore of Lake Victoria seem erroneous, for a check on the actual specimens indicate that they do not belong to this race of *etesipe* ; his distributional map is thus at fault in these respects. I shall refer to these specimens in the appropriate place.

MALE. Fore wing length 38–41 mm. *Upperside.* Ground colour blue-black with blue or greeny-blue sheen at base of wings. Fore wing pattern as in nominate *etesipe*, but discal white spots slightly bolder ; the line of post-discal spots more incurved in area 3 conforming to the slightly incised outer margin of the wing ; the spots in 1a–2 usually bluer. The hind wing pattern basically similar to *etesipe* but the post-discal blue bar a brighter blue and shading to whitish at inner fold, the whole band wider, the blue in 1–4 being fused as a block though the spots in 6–7 are elongate and free ; the costal spot in discal line is white. Submarginal white marks elongate, marginal border above upper tail maroon, then from tail to anal angle greeny-blue. *Underside.* Pattern as in *etesipe etesipe* but basal reddish-brown bars in fore wing rather stronger ; the pale triangle in 3–4 less distinct ; on the hind wing the discal white to cream interspaces rather larger.

FEMALE. Fore wing length 40–44 mm. *Upperside.* Pattern conforming to the general pattern of the nominate race but fore and hind wing light bars broader. The spots in the fore wing discal line larger and there is a compensating reduction in the length of the post-discal spots in 3–4, but an increase in the marks in 1a–2, thus the bar tapers more rapidly from the subapical mark in 2 toward the costa ; the spots in 2–3 may be separate or just touching. The hind wing bar is of almost equal width from costa to inner fold though tapering slightly toward the anal angle. The submarginal linear white marks are usually clear and distinct, but occasionally smaller and obscured above upper tail to upper angle. The margin above upper tail usually strongly reddish, then greenish to anal angle ; extreme edge black with white fringe internervularly. The fore wing bar is usually creamy, the hind wing band whiter but flushed with bluish to greenish on the borders. In other specimens the fore wing bar may be ochreous, the hind wing band also ochreous except for the whiter mark at costa. *Underside.* Differs from the nominate in the manner described for the males. There is an enlargement of the white or creamy areas due to the increase in width of the pattern above, thus the underside appears lighter.

There is some degree of instability in the width of the hind wing blue band in southern representatives of this race in the male sex, and an even greater degree of variation in the size of the females.

Range : This subspecies occurs in the western foothills of Kilimanjaro (Arusha and Moshi), and east of the Pare Mts., in the Taveta district ; it is plentiful on the Teita Range and in the coastal forests of Kenya, extending southward to Songea and the Ruvuma River in Tanzania, where it apparently meets *penricei.* It is recorded from the southern end of Malawi ; in the forests of Mozambique inland from Beira ; it occurs on the eastern side of the Vumba Mts., in Rhodesia and reaches as far south as N. Zululand.

Females have been observed laying on *Entada pursaetha* DC. (*gigas* auct.) (Mimosaceae) in the Teita and Coast districts of Kenya ; several families have been raised on this plant.

Charaxes etesipe gordoni van Someren

(Pl. 6, figs. 43 and 47)

Charaxes etesipe gordoni van Someren, 1935 : 198.

Described from six very uniform males. Upperside very similar to *etesipe tavetensis* but fore wing white spots rather stronger ; on the hind wing the submarginal linear white marks more developed. On the underside the basal chestnut-brown marks stronger in fore wing, those of hind wing also stronger ; the double row of black submarginal marks strong, the tornal double spot marked. The dark marks toward the upper angle of the hind wing strong. The ground colour of fore and hind wings darker.

At the time of describing this race the female was not known ; a specimen has since been taken.

FEMALE. Fore wing length 45 mm. *Upperside.* Ground colour black with strong green sheen toward base ; spot in cell moderately large ; discal spots large and rounded with exception of minute spot in sub-base 5 ; upper post-discal spots large, that in 5 smaller, others increasing in size to 3–4, then spots broad to hind margin ; all marks creamy white ; marginal spots 6–7 present but obscured. Hind wing with broad bar, white at costa, then white with slight creamy tinge but strongly bluish on outer border ; the dark pattern of below shows through slightly ; submarginal linear white marks bold except for that in 5 which is small ; marginal border above upper tail maroon, then becoming greenish to ochre beyond anal angle. Tails very long and slender, upper 10 mm., lower 12 mm. *Underside.* Strong chestnut-brown bars present at base of fore wing and in subcostal base of hind wing, as in the male ; fore wing with pale bar well marked. Distal half of hind wing, ground colour greyish-olive, with black marks clear in submargin, the black mark at base of upper tail very strong ; margin above upper tail maroon then ochreous to greenish to anal angle.

Neallotype female. KENYA: At lower Meru forest near Mt. Kenya, iii.1950 (*R. E. V. Saunders*). British Museum (N.H.).

Range: So far only recorded from the north-east side of Mt. Kenya at Meru and Njombeni Hills.

Females noted laying on *Entada* sp. with small leaflets. Larvae found on younger sprays of leaves at forest edge; refused to feed on *Entada abyssinicus*.

Charaxes etesipe pemba **ssp. n.**

(Pl. 6, figs. 46 and 48)

Carpenter (1947 : 99) records a female specimen from Pemba and a male from Zanzibar and places the latter to *tavetensis*, and assumes that the Pemba female also belongs here.

Pemba Island is well north-east of Zanzibar and the two islands are not by any means similar; the former has a considerable amount of forest coverage and there are some known endemics on it, such as *Charaxes pembanus* Rothschild and a local race of *Euphaedra neophron*.

I have recently received a small series of *etesipe* from Pemba Island taken by Dr. Arthur Rydon and some from Mr. T. H. E. Jackson. These specimens indicate that these examples of *etesipe* are not *tavetensis* but represent an insular and distinct subspecies.

MALE. Fore wing length 41–42 mm. *Upperside.* With rather acuminate wings, the outer margin being strongly incised in 3–4, more so than in *tavetensis*, and much more than in nominate *etesipe*. The line of post-discal spots is thus more curved, conforming to the contour of the outer margin. These spots and those of the discal line are bold and show up clearly in the strong blue-black ground. The hind wing blue band is post-discal and is narrower than in *etesipe tavetensis* from 1c–4, the spots in 5–6 are free and there is an indication of a spot in 6; the subcostal mark is absent or just faintly indicated. The reduction of the band is on the inner side. The submarginal linear white marks are strongly developed; the margin above the upper tail is without red or there is just an indication of red in the otherwise greenish line which extends to the anal lobe. *Underside.* Generally darker than *tavetensis*, the basal brown lines are almost black; the hind portion of the fore wing almost black shading to bluish-grey and the double line of black submarginal spots with bluish connecting ground pronounced in 1b and above at the tornus; the upper outer half of the wing more greyish-olive, less buffy.

FEMALE. This is relatively large, fore wing length 48 mm. *Upperside.* Ground colour black with strong green sheen at bases of wings. Spot in cell distinct, upper subcostal large with two white streaks above at costa; two minute dots in 4 and 5, large spots in 3–2 contiguous or fused with the post-discal spots; post-discal spots in sub-apex rather long ovoids, the lower spots increasing in size to hind margin; this bar is creamy, or white, tinged slightly with cream. The hind wing band, continuous with fore wing bar, is whitish at costa, then white with bluish or greeny-blue on borders; submarginal linear white marks distinct and bold; margin maroon above upper tail or mixed with greenish, rest of margin green to anal lobe; edge black with white fringe between veins. Tails long and slender, upper 6 mm., lower 7 mm. *Underside.* Basal chestnut bars strong; the upperside pattern strongly represented below and whitish; the submarginal row of graduated black spots strong and the mark in 1b at tornus very marked; admarginal black line distinct. Hind wing costal white border strong; basal brown lines strong, and the discal band indicated by creamy interspaces clear; distal third of wing olive-greyish traversed by a double row of black post-discal spots; submarginal white line outlined distally in black distinct, especially the black spot at base of upper tail ; margin ochreous-olive ; edge black with white fringe between veins. The underside is thus more heavily marked and more contrasty than in *tavetensis*.

Holotype male. TANZANIA : Pemba Island, north east of Zanzibar, ix.1963 (*A. Rydon*). British Museum (N.H.).

Allotype. female, same data. British Museum (N.H.).

Charaxes penricei penricei Rothschild

(Pl. 7, figs. 49–51, 53–56)

Charaxes penricei Rothschild in Rothschild & Jordan, 1900 : 460 [♂].
Charaxes peculiaris Lathy, 1906 : 125.

MALE. Fore wing length 38–40 mm., more pointed than in *etesipe etesipe*, outer margin distinctly incised. *Upperside*. Ground colour blue-black with strong greeny-blue sheen at base ; pattern somewhat as in female *etesipe* thus differing considerably from male *etesipe*. The spots in the distal portion of the wing are large and arranged as follows : one large spot at end of cell, triangular or quadrate ; a large spot, elongate-quadrate sub-basal in 6 with a small spot sub-basal in 5 ; large spots sub-basal in 3 and 2, round and quadrate ; two large subapical spots in 7–6 followed by larger more ovate spots in 4–3 set in more proximad ; a large double fused somewhat quadrate mark indented on inner border in 1b followed by a longer narrower mark in 1a. The upper spots are white, those in 1a–2 with bluish scaling on borders. The position of the oblique bar is thus set in toward the discal line so that there is a wide distance between its outer edge and the margin of the wing. Margin with distinct white internervular spots, double in 1b. Hind wing ground colour blue-black, crossed by a broad band commencing at the costa and extending toward the inner fold ; the costal mark in the discal line is white, slightly bluish distally, it may be fused with, or slightly separated from, the smaller bluish spot below which may be fused with the larger contiguous spots which extend to the inner fold above the anal angle. This bar is white in the central line, bluish on the borders, particularly strong on the distal edge. The dark pattern of below is slightly apparent in the band. There is a complete row of marks in the submargin, which may be linear or triangular and edged distally with blue ; double in anal lobe. Margin above upper tail usually maroon then narrowly blue or bluish-green to anal angle ; edge black with white fringe between veins, strong at anal lobe. *Underside*. The coloration and pattern is confusingly like *etesipe tavetensis* though less variable ; the chief difference lies in the position of the oblique white bar which is much more proximad in *penricei* and being wider shows up more distinctly. On the hind wing the costal and subcostal white is more prominent because it is whiter and less creamy tinged. In other respects the markings are similarly placed (Pl. 7, figs. 49 and 50).

Variation. It is appropriate to draw attention to certain variations in the male sex. Two such variants are depicted on Pl. 7, figs. 51 and 56, which are figured alongside *penricei dealbata* which they somewhat resemble. This departure from the nominate is mainly in the degree of bluish scaling suffusing the spots in the fore wing band and over the discal band in the hind wing. This may be accompanied by a reduction in the width of the hind wing band in 6–7 as in fig. 51 or a division of the mark in 6 as in fig. 56. Such variants seem to occur in greater degree on the margin of the range of the nominate race, to the east, such as at Lundi in Rhodesia, Zomba in Malawi, Songea in Tanzania and less frequently in Zambia.

The aberration *peculiaris* Lathy (1906 : 125) is merely one in which the bluish scaling is replaced by greenish-blue.

An aberration from Lundi is interesting in that the mark in fore wing in area 1b–2 on the underside is a long double streak.

FEMALE. The typical female is in most respects an enlarged replica of the male, but with less strong blue-black ground and less blue scaling in the pattern. Fore wing length 43–45 mm.

Upperside. Ground colour black with bases of wings scaled with olive and some greeny-blue sheen. Fore wing pattern as in the male but larger and bolder, all marks pure white occasionally with a slight amount of blue-green on proximal edge of large spot in 1b. Hind wing with a comparatively wide band filling the discal area from costa to the inner fold above the anal angle, the band is mostly white with some blue on the distal border ; there is an indication of the underside pattern showing through. Submargin and margin as in the male. Tails long and slender, upper 8 mm., lower 9 mm. The typical female is thus somewhat like a pale barred female of *etesipe* but the fore wing bar is whiter and the hind wing band bluer, and the shape of the fore wing is different. *Underside.* As in the male but white pattern bolder, in keeping with the white pattern of above (Pl. 7, figs. 53 and 54).

Variation. In very fresh specimens the fore wing band may be very slightly creamy but this soon becomes white. However, one does find very rarely a specimen with the light pattern above definitely creamy-yellowish ; this is ab. *flavus* Lathy (1926 : 95) which is recorded from Chintechi on the west side of Lake Nyasa (Pl. 7, fig. 55).

Range : The nominate *penricei* ranges from about central Angola eastward through the western block of Zambia and southern Katanga northward to the Southern Highlands of Tanzania, just north of Lake Nyasa, south of Malawi to Rhodesia mostly in the Vumba area and just south (vide map B).

Charaxes penricei dealbata Joicey & Talbot

(Pl. 7, fig. 52 ; Pl. 8, fig. 57)

Charaxes penricei f. *dealbata* Joicey & Talbot, 1922 : 337–338.

Originally placed as a variety of *penricei*, it seems best to treat it as a subspecies, since there are no records of nominate *penricei* within the area of its distribution. This subspecies was described from two males captured in Portuguese Congo, and associated with them was a specimen from Pungo Andongo, which is in north-west Angola. This last was cited as a paratype, and was figured by Carpenter (1947) ; it has been made available to me for study by the British Museum (N.H.).

MALE. General shape that of *penricei* (thus unlike *etesipe*), fore wing length 36 mm. *Upperside.* Ground colour brown-black but probably faded from a blue-black. Fore wing pattern as in nominate *penricei* ; upper white spots slightly larger to 3, the outer spot in 2 bluish with white proximally, the spots in 2–3 well separated ; the double blue spot in 1b more quadrate, that in 1a narrow and slightly longer ; the hind portion of the band is thus narrower than in nominate *penricei.* The hind wing band starts in 6 with a blue spot confluent with the white costal mark, the next two spots are free, the remainder contiguous and slightly wider, that at the side of the inner fold, the longest. There is no indication of a white central area, the band is thus solidly blue and is just off the discal line at the costal end. Submarginal white spots small but more pronounced in anal angle ; margin with very little reddish above upper tail, but greenish to anal lobe. *Underside.* Fore wing basal lines are strong but dark brown with slight black outline ; the light areas have a bluish tinge, the lower half of the distal portion of fore wing also bluish, otherwise general pattern as in nominate *penricei.*

The female seems to be unknown.

Range : Portuguese Congo to the north of the mouth of the Congo River, also Pungo Andongo in north-west Angola. This range is divided by the presence of *etesipe etesipe*, which occurs in the Luanda area of Angola, northward to the Congo River.

***Charaxes penricei tanganyikae* ssp. n.**

(Pl. 8, figs. 58–60)

I have before me a series of 12 males and a few females which exhibit characters suggestive of *dealbata*, thus belonging to the species *penricei*, rather than to *etesipe* or to any of its races.

The points indicative of close relationship to *penricei* are : MALE. *Upperside.* The size of the spots in the fore wing and the position of the outer row forming the bar, i.e. the spots are set well in from the outer margin, thus more proximad than in *tavetensis* ; the band is also wider in its lower half. In the hind wing, the blue band is also more proximad and, as in the case of *dealbata*, this band lacks any white except for the costal quadrate spot which may be large and continuous with the next blue spot or small and separated from it. There is some variation in the width of this hind wing band ; if wide, it extends proximad toward the mid-discal line and there may be a few whitish scales in the centre. In this latter instance the specimen bears a strong resemblance to the blue-banded variations of nominate *penricei*, already mentioned under that species. *Underside.* In general appearance some examples are almost as dark as in *etesipe abyssinicus*, thus considerably darker than nominate *penricei*, but the position of the light bar in the fore wing and the white interspaces on the hind wing are similar to *penricei*.

FEMALE. *Upperside.* Pattern similar to that of nominate *penricei* in both fore and hind wing, but with slightly less blue. *Underside.* Markings are similar to those in the male except for a strong indication of white bars of above.[2]

Holotype male. TANZANIA : Kigoma. East side Lake Tanganyika. xii.1961 (Japanese Expedition).

Allotype female. TANZANIA : Geita, Biharamulo district, x.1937 (*T. H. E. Jackson*). British Museum (N.H.).

Range : This subspecies is found mainly on the eastern side of Lake Tanganyika from Kigoma-Mpanda and on both sides of the south end of the lake and thus extends slightly into the Albertville area of Katanga. To the north, it extends into the Biharamulo district of western Tanzania and the Geita area to the south west of Lake Victoria. This distribution embraces localities from which came specimens determined by Carpenter as (a) *penricei* female. Specimen 1. (b) male, not typical *penricei* . . ? intermediate *penricei tavetensis*. Specimen 5.

These specimens have been examined by me and carefully checked ; they belong to *penricei tanganyikae*.

***Charaxes paradoxa* Lathy stat. n.**

(Pl. 8, figs. 61 and 62)

Charaxes etesipe paradoxa Lathy, 1926 : 94 [♂].

The relationship of *paradoxa* from the Comoro Islands to *etesipe* and *penricei* has been debated by Carpenter (1947 : 95, Table I) who gave it as his opinion that *paradoxa* is related to *tavetensis* and thus a subspecies of *etesipe*.

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[2] *Variation.* Since the description of the female was written, other similar examples have been received from the Kigoma area. In addition, one female has enlarged fore wing spots, strongly tinged with blue, especially those of 1a–2; the hind wing patch is broad, strongly suffused with blue but with white central marks in 5–6, and the costal mark elongate-quadrate. TANZANIA : Kigoma area, Mihumo, vi.1965 (Japanese Expedition).

Unfortunately, I have been unable to examine actual specimens, and must rely on my interpretation of the excellent photographs of both sexes kindly supplied by the British Museum (N.H.).

MALE. It will be noted that the fore wing inner spots are large, considerably larger than in *etesipe* or *tavetensis* ; that the post-discal series forming the main bar are also large, and that the lower spots in 1a, 1b–2 though more restricted than in *penricei* are very similar to ssp. *tanganyikae* ; that this row is incurved at 3, following the contour of the wing ; that on the hind wing the blue band is set in as it is in *tanganyikae* and is in line with the costal white spot. The submarginal spots are large ; the tails relatively short and more robust. On the underside the pattern comes within the variation of the *tanganyikae* aggregate for the male ; that of the female is distinctive and unlike that of *tavetensis*.

In my opinion *paradoxa* appears to have been derived from *penricei* through a form very like *tanganyikae* (to which it bears a close resemblance) but because of its long isolation and stability of characters it should rank as a species.

Range : Grand Comoro Island.

Charaxes cacuthis Hewitson

(Pl. 8, figs. 63 and 64)

Charaxes cacuthis Hewitson, 1863 : 63 [♂].
Charaxes antanala Lucas, 1872 : 1 [♀].

It is generally agreed that *cacuthis* has been derived from a *penricei*-like ancestor, and that by reason of prolonged isolation has evolved characteristic features in both sexes, divergent from any mainland form, and should now be considered an insular species.

MALE. Fore wing length 36–38 mm. *Upperside.* Ground colour blue-black with a strong blue sheen basad. The pattern is similar to the blue variation of nominate *penricei* and very similar to *penricei tanganyikae* ; the forward spots are large and white, the blue marks in 1a–2 extended more basad so that the band is here broader. The marginal spots are indistinct and glaucous. The hind wing blue band is wide, almost straight on its inner border, slightly angled at 4 on outer margin ; the costal spot is white and directly below are two white marks in disc of the band and some whitish scales along the inner border in some examples. Margin above upper tail slightly reddish, then blue to green to anal lobe ; submarginal spots strong but small. Outer margin of hind wing to upper tail rather dentate. *Underside.* Basic pattern typical of the group ; basal marks chestnut with black edges, all black in 1b ; the marks well developed ; the tornal black mark strong. Hind wing costal border strong, subcostal discal white mark distinct but small followed by more buffy white marks in discal line ; margin above upper tail more reddish than above ; black mark at base of upper tail strong ; margin to anal angle buffy-olive and green.

FEMALE. This sex exhibits considerable divergence from any mainland representative of the group. Fore wing length 40–42 mm. *Upperside.* Ground colour brown-black with some purply-green sheen at base. Cell with indications of dark marks from below, subterminal spot orange-tawny conjoined to mark in 4 by more obscure orange spot ; discal spots in 4–6 elongate, conjoined to post-discal elongate spots by rays ; these spots tawny-orange to orange as are the more elongate spots in 2–3, which are a fusion of the discal and post-discal spots, the line of fusion indicated by thin blackish lines ; the large quadrate spot in 1b and the elongate mark in

1a white, the former with some orange scaling on outer border and bluish scaling on inner ; there is some blue on distal end of mark in 1a. Margin of wing rather dentate in mid area and with tawny spots in 6–7. Hind wing with a broad white discal band with strong blue scaling on outer border on lower half, only slightly blue on inner ; some indication of dark marks of below in disc of band. Submarginal white spots strong or more obscured in region of tails ; margin with strong brick-red above upper tail then bluish-white with greenish to anal lobe. Tails long and slender 9–10 mm., black with a conspicuous white line in centre. *Underside*. Basic pattern as in the male but white areas enhanced by broad bar to fore wing and strong discal band in hind wing ; the lines and spots distinct on a paler ground.

Range : Madagascar, mainly in the centre and northern half of the island.

SYSTEMATIC LIST

Charaxes etesipe (Godart)

Charaxes etesipe etesipe (Godart, 1824). Type locality : Sierra Leone. Range : Sierra Leone, Nigeria eastward to S. Sudan, Congo, N.W. Angola, N. Katanga, Uganda and N.W. Kenya.

f. *castoroides* Poulton, 1926. Jinja, Uganda.

f. *caeruleotincta* Carpenter, 1945. Entebbe, Uganda.

abyssinicus Rothschild, 1900. Type locality : Shoa, Ethiopia. Range : Ethiopia, west of the Abyssinian Rift, mainly in high country.

patrizii Storace, 1949. Type locality : Ola Uagèr (Oltregiuba), Somalia.

tavetensis Rothschild, 1894. Type locality : Taveta, Kenya [♂], Dar-es-Salaam, Tanzania [♀], Range : Western foot-hills, Kilimanjaro (Moshi Arusha) ; east of Pare Mts., Taveta forest, Teita Hills ; Coast forests, Kenya. Tanzania north of Ruvuma River, inland to Songea district. Malawi south, Mozambique inland from Beira ; eastern Rhodesia, south to Zululand.

gordoni van Someren, 1935. Type locality : Meru, Mt. Kenya. Range : North-eastern side of Mt. Kenya and the Njombeni Hills, Kenya.

pemba, ssp. n. Type locality : Tanzania, Pemba Island. Range : Pemba Island off east coast, N.E. of Zanzibar.

Synonym : *etheta* (Godart, 1824). Type locality : " Côte occidentale d'Afrique ".

Charaxes penricei Rothschild

Charaxes penricei penricei Rothschild, 1900. Type locality : Quebe River, Angola. Range : Central Angola, southern Katanga, Zambia, the southern Highlands of Tanzania north of Lake Nyasa, South Malawi, and eastern Rhodesia.

ab. *peculiaris* Lathy, 1906 (male). Kawama, N.E. Rhodesia.

ab. *flavus* Lathy, 1925 (female). Chintechi, Malawi.

dealbata Joicey & Talbot, 1922. Type locality : Kibokolo do Zombo, Portuguese Congo [♂]. Paratype [♂] Pungo Andongo, N. Angola. Range : Portuguese Congo and N.W. Angola at Pungo Andongo.

tanganyikae, ssp. n. Type locality : Kigoma, east side Lake Tanganyika. Range : The eastern and southern shores Lake Tanganyika, also in Biharamulo district, Tanzania, Geita, south-west Lake Victoria.

Charaxes paradoxa Lathy

Charaxes paradoxa Lathy, 1926. Type locality : Grand Comoro Island. Range : Comoro Islands.

Charaxes cacuthis Hewitson

Charaxes cacuthis Hewitson, 1863. Type locality : Madagascar. Range : Limited to Madagascar.

3. *CHARAXES PEMBANUS* JORDAN AND *CHARAXES USAMBARAE* VAN SOMEREN & JACKSON

Charaxes pembanus Jordan

(Pl. 9, figs. 67 and 68, 71 and 72)

Charaxes pembanus Jordan, 1925 : 289.

This species was described by Jordan from a single rather damaged male captured on Pemba Island, which lies off the East African coast, north-east of Zanzibar and about midway between Mombasa and Tanga.

This specimen remained unique until March 1963 when Commdr. Hollebone captured a pair, unfortunately extremely tattered when handed over, but still recognizable. This exciting capture induced Dr. Arthur Rydon of Mombasa, to fly over to Pemba for a week. By using a battery of hanging traps he was lucky enough to secure a perfect pair. On leaving, a couple of traps were left in charge of a friend and this resulted in two more females being captured. A short time afterwards, the island was visited by Mr. T. H. E. Jackson, but only a single rather damaged male was added to the small series from which I now give full descriptions of both sexes.

MALE. Fore wing length 33–35 mm. ; margin of wing slightly concave at 3–4 with a slight projection on vein 2, apex of wing thus rather pointed, outer margin slightly dentate and narrowly white fringed between veins. *Upperside.* Ground colour blue-black with slight greeny sheen in side light ; two small subapical blue spots, and a larger blue spot beyond end of cell. Hind wing ground colour blue-black, duller toward inner fold ; there is the slightest trace of a greenish post-discal wavy line opposite the tails ; submarginal spots bluish to whitish, small and punctiform ; marginal border with greenish-blue lunate marks, with some dull red scaling in marks above upper tail, becoming more olive in region of tails and anal angle. Tails thin, upper 6 mm., lower 6 mm., black with fine bluish-white central line. *Underside.* Fore wing ground colour very dark brown with stronger brown in the distal curve of the wing, separated by a paler satiny triangle toward the apex ; thin black lines strongly accentuated by white edging, conspicuous in the basal half of the wing ; post-discal row of black spots not conspicuous except in 1b ; submarginal row obscured except at tornus in 1b. Hind wing ground colour as fore wing, rather darker distally ; fine black lines outlined in white in basal area. A satiny line crosses the disc and this joins another satiny post-discal bar just above the anal angle, these bars finely outlined in black ; the outer border of the post-discal bar strongly bordered by a series of crescentic maroon marks extending from costa to above anal angle ; submarginal line lilac-greyish adjacent to series of maroon lunules outlined in greenish above upper tail and more olive to anal lobe carrying admarginal black triangular marks. The underside is thus ornate, but not conspicuously patterned.

FEMALE (Neallotype). Fore wing length 43 mm. Outer margin *not* very incurved at 3–4, but slightly dentate with a stronger projection at vein 2. *Upperside.* Ground colour brownish-black with a slight purply sheen toward base, darker on distal half of the wing. Wing crossed by two lines of creamy-white spots as follows : discal line, two large spots beyond end of cell in 6–5, a minute dot based in 4, followed by larger marks increasing in size from 3 to hind margin, mark in 1a a long streak ; post-discal spots, three subapical in 7–5, followed by slightly larger spots in 4–2 placed in a slight curve conforming to the contour of wing, double spots in 1b contiguous with discal mark and set in slightly, the post-discal spots slightly brownish scaled distally. Margin with very slight white fringe between veins. Hind wing ground colour blackish-brown, slightly more greyish at inner fold ; discal band creamy white, extending from costa to above anal angle, almost uniform in width but tapering toward anal lobe ; some longish white hair-like scales on inner border over cell area softening the inner edge. Submarginal row of linear lilac-white marks complete, double at anal lobe ; marginal row of crescentic maroon marks strong above upper tail, then olive to anal angle ; tails long, but *not* thin and tapering, upper 8 mm., lower 7 mm., black with whitish central line. Margin of hind wing rather strongly dentate-serrate. *Underside.* Ground colour of fore wing greyish-brown, more strongly reddish-brown distally toward curve of wing ; basal area with black lines outlined with white as in the male ; discal bar of upper side strongly represented, bordered on inner edge with black lines, the spot in 1b with black marks distally ; post-discal row of spots distinct, upper ones to 2 buffy in colour ; submarginal black spots faint except for the large double mark at tornus 1b. Hind wing basal area brownish with thin basal black lines ; discal whitish line of above clear cut, outlined proximally in black and distally by the double row of olive and maroon crescentic marks extending from costa to above anal angle, the row strongly angled in 5 ; submarginal line of lilac-white marks edged black distally, complete and contiguous with the marginal lunate marks, maroon above upper tail then olive to anal angle, distally bordered with bluish-grey at edge.

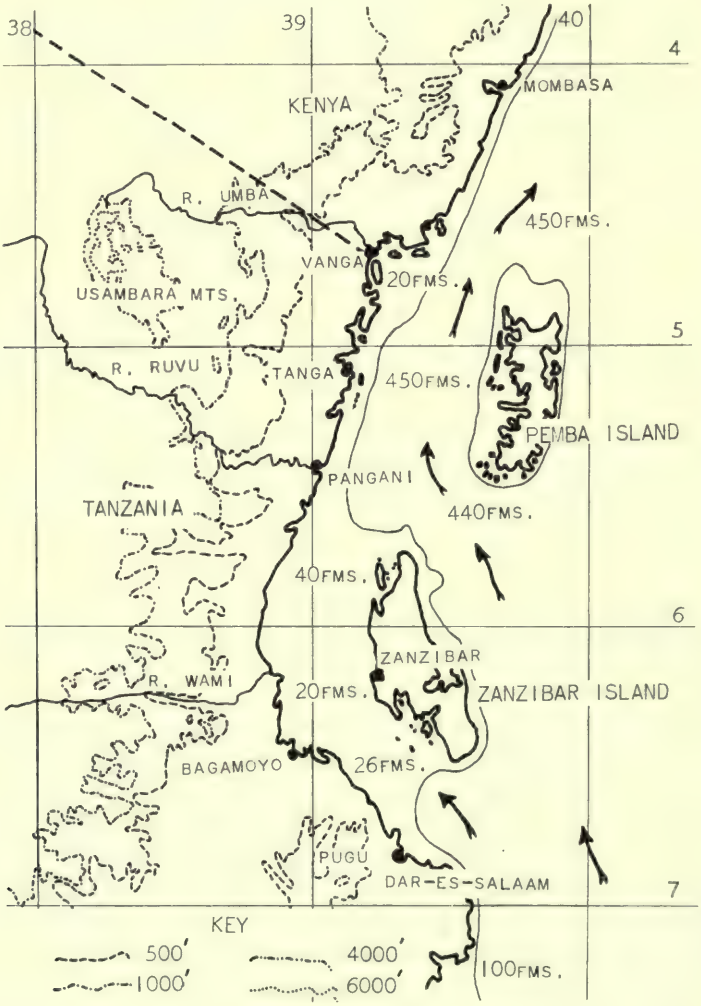
Neallotype female. Pemba Island, off Kenya–Tanzania coast N.E. of Zanzibar, ix.1963 (*A. Rydon*), deposited in the British Museum (N.H.).

A second female taken on Pemba, x.1963 by Mrs. Mike Heincen, agrees with the type in all essentials. The fore wing series of creamy spots are slightly more united in area 2, and the hind wing band is slightly more irregular on the outer border.

A third specimen (the first ♀ to be captured, Hollebone, iii.1963) presents some divergent features : the two rows of fore wing spots are larger and completely separated up to the long streak in 1a. The basal area of the fore wing is strongly blue-black and the hind wing band is suffused with blue scaling on the borders, except in the upper third. On the underside, the ground colour is more generally reddish-brown, and the markings accentuated.

Range : So far as is known, this insect is confined to the Island of Pemba which lies north-east of Zanzibar Island, but separated from it by a deep fissure some 450 fathoms deep ; Zanzibar, on the other hand, is part of a coral shelf and separated from the mainland by a shallow channel 20 fathoms deep (Map C).

Pemba Island was probably separated from the mainland long before Zanzibar was ; it now has several indigenous races of birds and insects, indicating long isolation. The fauna of Zanzibar, on the other hand, is mainland in character. Pemba has some residual areas of mixed forest toward the north and *Albizzia* spp. are common. Dr. Rydon suggests that *pembanus* may lay on *Albizzia*. Specimens were taken at the forest edge and in adjoining clove plantations.


38
39
40
4
5
6
7
KENYA
MOMBASA
R. UMBA
450FMS.
VANGA
20FMS.
USAMBARA MTS.
R. RUVU
TANGA
450FMS.
PEMBA ISLAND
PANGANI
TANZANIA
440FMS.
40FMS.
ZANZIBAR
R. WAMI
20FMS.
ZANZIBAR ISLAND
BAGAMOYO
26FMS.
PUGU
DAR-ES-SALAAM
KEY
500′
1000′
4000′
6000′
100FMS.

MAP C

Charaxes usambarae van Someren & Jackson **stat. n.**

(Pl. 9, figs. 65 and 66, 69 and 70)

Charaxes pembanus usambarae van Someren & Jackson, 1952 : 275.

When we described this insect from the Usambara in 1952, we placed it as a subspecies of *pembanus* because of certain similarities, especially on the underside of the males. The male type of *pembanus* was a rather damaged specimen and the female was not then known. The association appeared justifiable at the time ; however, since the acquisition of more material from Pemba has made a more critical examination possible, I am of the opinion that *pembanus* and *usambarae* should not be considered conspecific for the following reasons :

Males. The shape of the two are different, *usambarae* having the fore wing much more falcate, the apex thus more pointed ; the outer border much more incised or concave, and the margin crenate-dentate ; the hind wing margin more serrate ; the tails more slender and longer ; the pattern on the underside is different in detail.

Females. The shape of the fore wings are different, *usambarae* being longer, more falcate, more incised on outer border, more dentate on margin ; the tails longer and more slender. Apart from the fact that the fore wing pattern of known *usambarae* females is like *ethalion* f. *rosae*, thus differing entirely from *pembanus*, the position of the post-discal spots are different, they are set further in from the apex and the angle formed between the three subapical and spots in 3–4 is more acute. The underside pattern is different. (cf. *etheocles*, *ethalion* and *viola* in regard to shape.)

MALE. Fore wing length 37 mm. Shape falcate, apex pointed, outer border incised and margin crenate-dentate. *Upperside*. Ground colour blue-black with slight green-blue sheen at base ; two small subapical blue spots followed by one subcostal beyond end of cell and one spot at end of cell ; margin with blue internervular streaks and white fringe between veins. Hind wing blue-black duller in region of inner fold ; a very slight indication of a post-discal greeny line from above anal angle to 6 ; submargin with triangular blue marks white at base, strong at anal angle to 4 then as very small dots to 6. Margin with strong greenish contiguous lunules with slight admixture of red or dull reddish above upper tail. Tails long and slender, upper 7 mm., lower 6 mm. ; margin of wing serrate to 7. *Underside*. Ground colour fore wing very dark mahogany-brown, base of wing with thin black lines ; costal area with a quadrate satiny patch followed by a quadrate dark brown area, upper part of apex satiny ; a post-discal zigzag black line runs from subapex to 1b, followed by a submarginal row of dark spots becoming black in 1b–2 ; margin with slight white fringe between veins. Hind wing ground colour dark mahogany or chocolate-brown, upper part of basal area with fine black lines ; a slight indication of a satiny line followed by a dark bar in discal line from costa to cell followed by another satiny line faintly outlined in black proximally, is followed by a line of contiguous olive and maroon lunules from costa to anal angle, proximally and distally edged with black ; marginal line greenish, and dark maroon above upper tail, then olive with lilac spots to anal angle ; margin of wing serrate-dentate.

FEMALE. As already noted, all the known females of *usambarae* have a pattern rather similar to that of *Charaxes ethalion* f. *rosae*, thus resembling also the females of *Charaxes cithaeron* and *Charaxes violetta* in some degree, and quite different from the female of *pembanus*.

Fore wing length 43 mm. Shape falcate, outer margin incised or concave, and dentate at veins. *Upperside*. Ground colour brownish-black at base of wing, blacker on distal half; disc of wing with a curved white band commencing at the costa at apex of cell to base of 3 then widening to streak on hind margin; some violet-blue scaling on ends of white marks in 1a–1b especially on proximal end; there are two white spots beyond the cell; post-discal spots white and small, three in a subapical row, spot in 4 set well in, those in 2–3 more linear, that in 2 touching the large white mark in discal line. Edge of wing with white fringe between veins. Hind wing ground colour brownish-black at base, slightly darker on distal border; discal band extending from costa to above anal angle white, with strong violet-blue suffusion on borders; submarginal linear violet-whitish marks complete from upper angle to anal lobe followed by a black zone adjacent to the marginal border which is reddish above upper tail then olive to anal angle; edge black with slight white fringe between veins. Margin of wing serrate; tails long and slender, upper 10 mm., lower 10 mm. *Underside*. Fore wing ground colour brownish, slightly darker on outer border and in space between discal and post-discal rows of spots; apex greyish and surround of upper post-discal spots also greyish; submarginal dark spots diffuse in upper half becoming bolder and blacker in 3–2, double black mark in tornus at 1b bordered outwardly with white. Hind wing ground colour brownish, black lines in upper half of base distinct; discal pale band whitish in upper half but suffused with brownish scales in lower half; post-discal lunate olive and dull crimson zigzag line, black edged internally, very distinct. Submarginal lilac-whitish linear marks, outlined in black distally, continuous from upper angle to anal lobe; margin dull reddish above upper tail then olive-greenish to anal lobe.

The specimen from which this description is made is in good condition and does not differ in any essential from the rather damaged type and paratype.

Range: So far, only recorded from the Usambara Range in Tanzania, and mostly from the Amani area. Nothing is known of its breeding habits.

SYSTEMATIC LIST

Charaxes pembanus Jordan

Charaxes pembanus Jordan, 1925. Type locality: Tanzania, Pemba Island. Range: Confined to Pemba Island.

Charaxes usambarae van Someren & Jackson

Charaxes usambarae van Someren & Jackson, 1952. Type locality: Tanzania, Usambara. Range: Only recorded from the Usambara Range.

4. THE *CHARAXES BERKELEYI* GROUP

Charaxes berkeleyi van Someren & Jackson[3]

(Pl. 11, fig. 81–83)

Charaxes aubyni Poulton [*recte* van Someren & Jackson]; van Someren & Jackson, 1952: 274 [as form or species, ♂ and ♀].

Charaxes berkeleyi van Someren & Jackson, 1957: 52.

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[3] While this paper was in press, further information has come to hand which may alter the concept of *Ch. berkeleyi*. Nomino-typical *berkeleyi* was described from east of the Rift Valley:—Ngong area, Aberdares and Nyeri, Mt. Kenya. Specimens have now been received from west of the Rift Valley:—Visoi, Kaptagat, Endebess, and east Elgon which are a distinct subspecies of *Ch. berkeleyi*. They fly together with *Charaxes evansi* van Someren & Rogers, 1932. *Ch. evansi* was described from East Elgon, and was placed as a subspecies of *etheocles* by van Someren & Jackson, 1957. The matter is still under investigation.

The original description reads as follows:

Male, upperside ground colour deep black with a blue reflection especially at base of fore wing. A blue spot in cell, another beyond with a very minute dot below it ; two subapical dots bluish-white. Margin greyish, broadly interrupted by black veins.

Hind wing with a narrow post-discal wavy green line from veins 1–5, followed by a submarginal series of small blue dots in each cellule. Marginal lunules green, their centres filled with red above upper tail. Tails long, thin, green with black margins, equal length, 6 mm. (Fore wing length 33–35 mm.)

Underside, fore wing dark greyish with a strong silvery satin sheen especially at the apex and distally to median line. Black basal and discal marks similarly placed as in the " etheocles " group ; post-discal zigzag line reddish, edged proximally with green then black ; submarginal spots strongly blue.

Female : Upperside ground colour black with blue sheen in reflected light, some rusty scaling on distal half of fore wing especially at margin. Discal and post-discal spots entirely separate, the latter small and orange in colour, the lower double spot placed on either side of vein 2, the former (discal bar) with proximal edge straight and pale yellow in colour, that in 1a whitish. There is often a small orange spot at end of cell.

Hind wing discal band white margined with blue ; complete series of submarginal blue spots ; marginal border reddish above upper tail then greenish to anal angle. Tails long, 8–7 mm. greenish with black edges.

Underside silvery grey with whitish discal band present on both wings ; otherwise markings as in the male, but bolder.

Holotype male. KENYA: Ngong area, bred, ii.1955.

Allotype female, same data (*van Someren*). Types and two paratypes in the British Museum.

The original descriptions are applicable to a majority in a long series of captured and bred specimens. The males are very constant above, but in some specimens the ground colour of the underside is rusty-brownish instead of greyish. Females may vary slightly as follows :

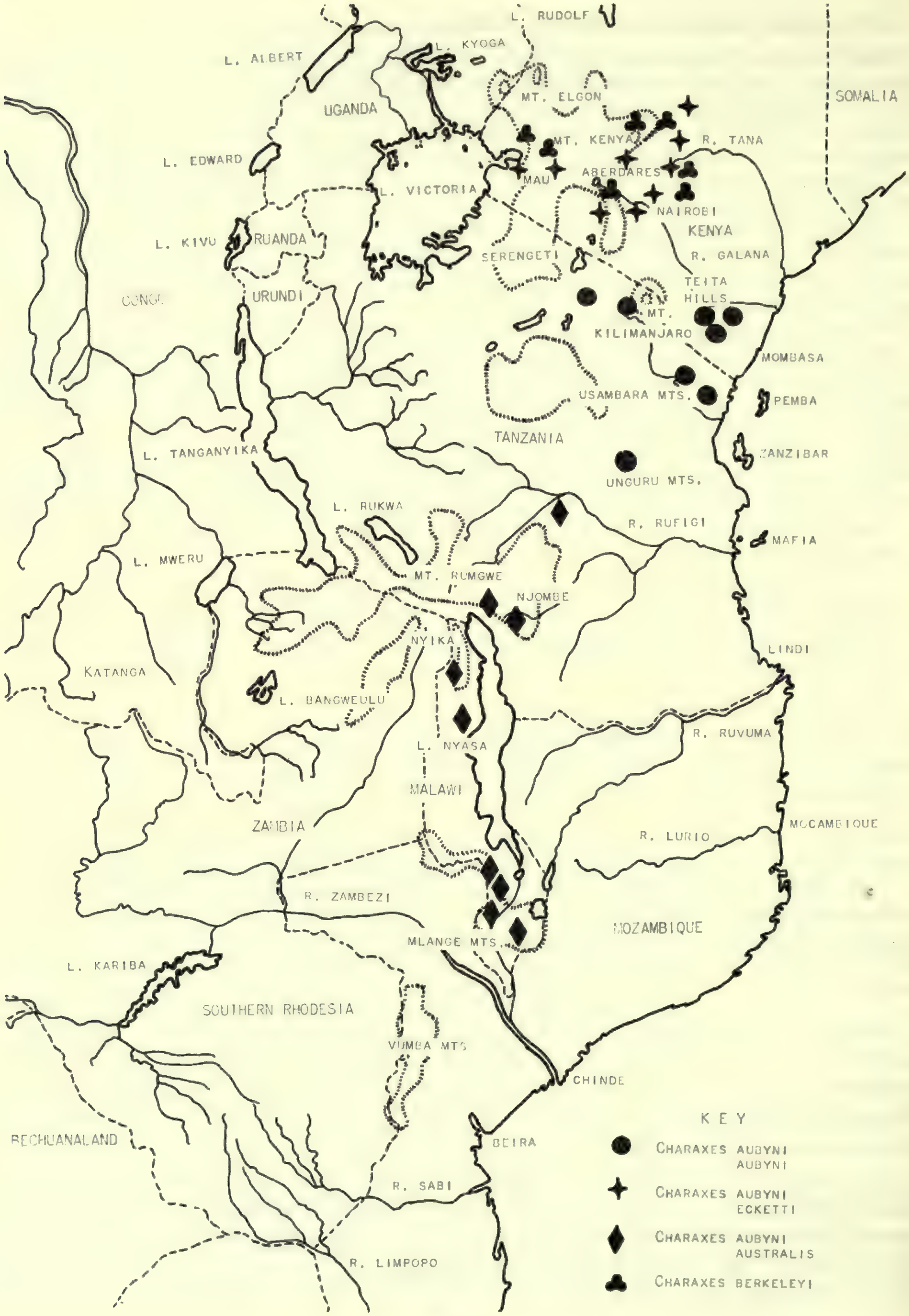
Variation. (a) The fore wing discal and post-discal spots may be paler, almost creamy with a slight ochre tinge to upper spots, the underside greyish and the whole pattern bold.

(b) The fore wing spots may be smaller and strongly orange and well separated.

(c) The upperside markings as in nominate race but the underside ground colour may be rusty-ochreous so that the ochreous discal bars on both wings are less in contrast, and are even suffused. This variant may appear in one family in the proportion 10 rusty to 15 greyish. (A similar variation occurs in both sexes of *Charaxes etheocles evansi* van Someren and is not seasonal.)

Range : Kenya, mostly east of the Rift Valley, Mt. Kenya, Nyeri, Aberdares, mostly on the eastern side ; Kikuyu Escarpment, Limuro, Nairobi–Ngong (Karen-Langata). West of the Rift, it occurs at Visoi-Eldama Ravine, Kaptagat, Mau, Kiptiget and Mwangoris. This species, in part of its range, overlaps *Charaxes etheocles evansi* with which it could be confused.

The status of this species was established by a series of bred families from known female parents. Females have been noted laying on *Albizzia gummifera* (Mimosaceae) mainly in the Ngong-Karen area ; occasionally on *Ochna holstii* (Ochnaceae), also at Karen ; on *Scutia myrtina* (Rhamnaceae) in the Kinangop area of the Aberdares. The eggs are usually laid on the upper surface of young leaves, but may be


L. RUDOLF
L. KYOGA
L. ALBERT
SOMALIA
MT. ELGON
UGANDA
MT. KENYA
R. TANA
L. EDWARD
MAU
ABERDARES
L. VICTORIA
NAIROBI
KENYA
L. KIVU
RUANDA
SERENGETI
R. GALANA
TEITA HILLS
CONGO
URUNDI
MT. KILIMANJARO
MOMBASA
USAMBARA MTS.
PEMBA
TANZANIA
L. TANGANYIKA
ZANZIBAR
UNGURU MTS.
L. RUKWA
R. RUFIGI
MAFIA
L. MWERU
MT. RUNGWE
NJOMBE
NYIKA
LINDI
KATANGA
L. BANGWEULU
R. RUVUMA
L. NYASA
MALAWI
ZAMBIA
MOCAMBIQUE
R. LURIO
R. ZAMBEZI
MOZAMBIQUE
MLANGE MTS.
L. KARIBA
SOUTHERN RHODESIA
VUMBA MTS
CHINDE
BECHUANALAND
BEIRA
R. SABI
R. LIMPOPO
KEY
● CHARAXES AUBYNI AUBYNI
✦ CHARAXES AUBYNI ECKETTI
◆ CHARAXES AUBYNI AUSTRALIS
♣ CHARAXES BERKELEYI

Map D

deposited on old. The eggs are greenish-cream when first laid but if fertile show a brownish ring around the upper disc. The larvae at all stages can be readily distinguished from those of *ethalion*, *viola kirki*, *aubyni ecketti* and *dilutus*, all of which may be found on the same food plant.

Charaxes aubyni aubyni van Someren & Jackson

(Pl. 10, figs. 73–75)

Charaxes etheocles etheocles ♀ f. *aubyni* Poulton, 1926 : 552.
Charaxes etheocles ♀ f. *aubyni* Poulton ; van Someren & Rogers, 1932 : 168.
Charaxes aubyni [Poulton] van Someren & Jackson, 1952 : 272.

For purposes of this revision it is desirable to give full descriptions of both sexes, and to indicate variations.

MALE. Fore wing length 35–37 mm. Shape very similar to male *Charaxes viola* but considerably larger, pointed, falcate, outer border concave at 3–4, hind angle at 1a–1b projecting rather strongly. *Upperside*. Ground colour deep black with greenish sheen, strongly greenish at base of costa and base of cell fore wing. Spotting of fore wing somewhat as in *Charaxes viola*, a subcostal blue spot at mid cell (sometimes vestigial) followed by two spots beyond end of cell, upper one large, and whitish, two subapical spots whitish or ochreous, followed in discal line by faintly indicated bluish spots to 1b ; marginal border with large greyish-green lunules separated by ends of dark veins, and in between the fringe is white. Hind wing ground colour black with greenish sheen over disc ; a wavy greenish post-discal line present from 5 to just short of the anal angle ; submarginal spots usually distinct especially toward upper angle, white or bluish ; marginal lunules well marked, greenish-maroon to upper tail then green to anal angle. Tails long, 5–6 mm., black with yellow-green central line. *Underside*. Ground colour dark brownish-grey with satiny bars crossing the cell, the disc, and apical triangle. Fore wing basal and discal black marks thin in upper half but stronger over 1b–2 ; double tornal black spots and one above strong.

Hind wing ground colour as fore wing, with satiny bars through the base and through the discal line ; post-discal zigzag olive and maroon line strong and complete ; marginal border strongly maroon above upper tail, then olive to anal angle.

FEMALE. Fore wing length 43–45 mm. Outer border in spaces 3–4 concave, apex falcate, margin slightly bluntly dentate. *Upperside*. Ground colour brownish-black with slightly greenish sheen. Fore wing pattern creamy-white to cream as follows : a spot often present in the cell and one at base of 4 (often small), discal row, two beyond end of cell, spots from 3–1a increasing in size and forming a long triangle with its base on hind margin ; post-discal spots, three subapical in a row, spots in 4–3 set in slightly, spot in 2 more distad, spots in 1b more diffuse and may merge slightly into discal mark in same area. Marginal lunules greyish, rather diffuse and indistinct though stronger at hind angle. Hind wing ground colour black crossed in the discal line by a triangular band widest at the costa and tapering toward the inner fold above anal angle, creamy in colour but shaded with greenish or greenish-blue especially on inner border. Submarginal row of linear spots may be distinct or slightly obscured in upper half, white or bluish toward the anal angle ; marginal border strong, reddish above upper tail then greenish to anal angle. Tails long and somewhat slender 6–5 mm., black with greeny-yellow median line *Underside*. Fore wing ground colour greyish-brown, more strongly brownish in curve of the wing, disc crossed by a paler satiny bar ; black lines strong at base and toward tornus ; the pattern of the upper side strongly represented, creamy-white. Hind wing ground colour rather browner than fore wing, upperside pattern strongly indicated, the discal bar bordered distally by the zigzag olive and red-brown post-discal line strongly marked in lower half; submarginal linear whitish-lilac strong; border above upper tail maroon, then greenish to anal angle and carrying black dots.

Variation. (a) Colour of fore wing pattern similar to the nominate, but discal and post-discal spots enlarged and joined together by rays.

(b) The pattern of the upperside fore wing ochreous to orange-ochreous; the hind wing band slightly ochreous; underside pattern yellowish; ground colour more brownish.

(c) ♀ form *ochrefascia* van Someren & Jackson (1957 : 47) (Pl. 10, fig. 75) somewhat like (b) but fore wing spots wider at hind margin in 1–3 and the discal and post-discal upper spots orange-ochreous, the two series joined together by rusty-rufous rays, the rusty colour often extending to the outer margin especially at apex. Hind wing band ochreous, margined by greenish-blue underside pattern more strongly ochre tinged.

Range: The nominate race was described from the Teita Hills, Kenya (Dabida, Wandanyi, Chawia); it is now known to occur on the adjoining hills of Mbololo and Sagala, but so far has not been taken on the Chyulu Range. In Tanzania it is found on Kilimanjaro and Monduli, the Usambara Range and Unguru Mts.

A specimen in the British Museum (N.H.) said to have been taken at Lindi has been examined; it belongs to the nominate race. Lindi is at sea-level on the Tanzania coast, and since the species *aubyni* is an insect of high elevations it is probable that the locality given is incorrect. (See also comment on "Lindi" as type locality of *Charaxes xiphares maudei* Talbot, another montane species.)

The food plants of this race are *Albizzia sassa* and *A. gummifera* (Mimosaceae). For full biological notes see van Someren & Jackson (1952, 1957).

Charaxes aubyni ecketti van Someren & Jackson

(Pl. 10, figs. 77–79)

Charaxes aubyni Poulton [*recte* van Someren & Jackson] form; van Someren & Jackson, 1952: 273–274 [Nairobi area to Mt. Kenya].

Charaxes aubyni ecketti van Someren & Jackson, 1957 : 48.

MALE. Fore wing length 33–35 mm., outer border slightly incurved and falcate. *Upperside.* Differs from nominate *aubyni* and *aubyni australis* by its generally smaller size and smaller and fewer fore wing spots. The spots are limited to one large blue subcostal spot beyond end of cell with a minute dot below, two ochre tinged subapical spots; marginal greeny-grey lunules smaller. Hind wing marginal border narrow, mostly greenish with just a trace of reddish above upper tail; submarginal row of bluish to whitish spots distinct or rather obscured, and internal to this a trace of a greenish post-discal wavy line opposite the region of the tails, sometimes absent. Tails shorter than in nominate. *Underside.* Deeper greyish-brown than nominate race but markings less strong except at base and tornal area; satiny bars present through disc and post-discal zone. Hind wing rather more tinged with purply-brown; the post-discal line of greenish and maroon lunate marks strong; the border more reddish above upper tail then olive to anal angle, narrow but distinct.

FEMALE. Fore wing length 38 mm. slightly falcate. *Upperside.* Ground colour blacker than nominate *aubyni*; discal and post-discal spots stronger yellowish-cream with an ochre tinge, thus richer than nominate race, but more restricted; discal spots: two beyond end of cell, a small spot at base of 4 may be present, spots in 3 to hind margin increasing in size but the whole bar is narrower than in *aubyni aubyni*; post-discal spots, about equal in size, are: three subapical in a row, spot in 4 set in a little with one below in 3, spot in 2 set out slightly; no spot in 1b or only a trace touching mark in discal row. Margin with only a trace of diffuse lunate marks. Hind wing discal band creamy to yellowish ochre, of almost equal width though tapering to inner fold, is bordered with greenish-blue ; submarginal spots small and distinct or somewhat obscured in the upper half ; marginal border as usual, reddish above upper tail, then greenish to anal angle. *Underside.* Fore wing ground colour darker greyish-brown with slight satiny bar at apex ; discal creamy bar distinct, upper post-discal spots strong culminating in strong tornal black marks on distal side. Hind wing discal band of above strong but narrower below ; bordered distally by the zigzag post-discal line of greenish-ochre and red which is strongly developed ; submarginal linear marks whitish to mauve outlined distally in black and with black dots toward the anal angle ; marginal border maroon above upper tail greenish to anal angle.

Variation. (a) Pattern as in typical female but pattern of fore wing almost white, otherwise similar.

(b) ♀ form *ochretincta* van Someren & Jackson (1957 : 49) ; (Pl. 10, fig. 79) the pattern of fore wing bolder, and orange-ochre sometimes with a pinkish tinge ; hind wing band though whitish at costa is strongly orange-ochreous otherwise.

Range : Kenya, mainly in the Nairobi–Ngong area and Kikuyu, extending to the Aberdares, Mt. Kenya, and Mau, Sotik and upper Mara River.

For full biological notes vide van Someren & Jackson (1957). The female lays on *Albizzia gummifera* (Mimosaceae).

Charaxes aubyni australis van Someren & Jackson

(Pl. 10, fig. 80)

Charaxes aubyni Poulton [*recte* van Someren & Jackson] ssp. ; van Someren & Jackson, 1952 : 273 [Vumba Mts. ♀].

Charaxes aubyni australis van Someren & Jackson, 1957 : 47 [♂].

This race was founded on five males taken at Nyamkowa, Malawi, and a single female from Vumba, Rhodesia, was associated with them, since it presented features which seemed to indicate relationship. This was a mistake, but at that time we had not appreciated the significance of the wide low-lying Zambezi Valley as being an ecological barrier between the montane areas of southern Malawi and the eastern mountains of Rhodesia. I have now had the opportunity of examining a small series of males and females from various parts of Malawi, and the males agree in all essentials with the type, but the females indicate clearly that the " Vumba " female does not belong here, but is, in fact, a female of *Charaxes gallagheri* van Son, which was not described until 1962, based on a male ; the female was described in 1963. The females are remarkably alike, but the males totally different. The authentic female of *aubyni australis* will be described hereafter, and a neallotype selected.

MALE. Fore wing length 33–34 mm. ; shape rather strongly falcate, thus very similar to *aubyni ecketti*. *Upperside.* Ground colour black with green sheen at base. Spots small, represented by a small blue spot beyond the end of the cell, subapical spots, reduced to the two upper ones, are small and white ; marginal lunules present but rather obscured. Hind wing ground colour black, with only the slightest trace of a post-discal greenish line in lower part, opposite the tails, or this may be entirely wanting ; submarginal line of small whitish dots most evident in region of tails ; marginal border narrow, mostly greenish with slight trace of red scaling above upper tail ; tails long and slender, black, with white median line, 6–5 mm. *Under-*

side. Fore wing ground colour dark brownish-grey with a slight golden bloom over disc, satiny bands not strong except at subcosta in apex ; pattern thus not strongly marked except for tornal black mark. Hind wing ground colour as fore wing, satiny discal band strongest toward costa ; post-discal zigzag line moderately strong, ochre and maroon ; submarginal line of greyish linear marks not strong ; marginal border narrow and only slightly reddish above upper tail and mostly greenish to anal angle. The whole underside is thus less strongly marked or variegated than in the nominate race, but is nearer to *aubyni ecketti* of the Kenya Highlands.

FEMALE. Fore wing length 37–38 mm. (type 37 mm.), thus smaller than *aubyni aubyni. Upperside.* Ground colour black with greenish sheen at base ; pattern as in other races, discal bar creamy-whitish ; the post-discal spots free from subcosta to 2, if carried to 1b, the spot merges with the discal mark in same area ; the main portion of the discal bar is not strongly triangular, for the increase in width of the spots is gradual from the rather larger rounded spot in 3. Hind wing ground colour black ; discal band, widest in cell area, is creamy bordered with greenish-blue especially in lower half ; submarginal line of white to bluish spots complete ; marginal border narrowish, reddish above upper tail then green to anal angle ; extreme edge black ; tails moderately long, 7–6 mm., black with greenish-ochre median line. *Underside.* Ground colour greyish-brown, darker in curve of fore wing and in basal area of hind wing ; satiny bars fairly strong, otherwise pattern similar to other races.

Neallotype female. MALAWI : Blantyre, 27.v.1962 (*H. McKay*).

Other material. MALAWI : Mlosa Stream, Mlanje, 2 ♀ (*Handman & Martin*).

Variation. (a) The pattern of the upperside rather restricted in areas 1a–1b of fore wing so that the lower part of the bar is narrow and all the post-discal spots including that in 1b free ; the colour of the spots a rich yellowish-cream. The underside ground colour more silvery greyish so that the whole pattern appears bolder.

(b) The fore wing pattern with larger spots than usual, with slight indication of creamy scales joining the discal and post-discal spots in upper half. Underside light pattern bolder. This variation is found in all races of *aubyni*.

Range : Malawi, in all the high forested slopes of Mt. Mlanje, especially on the Mlosa Stream ; also at Blantyre, Limbe, Zomba, Nyamkowa and on the Nyika Plateau. In Tanzania recorded from the Southern Highlands : Rungwe, Poroto, Njombe and Iringa. A specimen labelled " Lindi " in the British Museum (N.H.) belongs to the nominate race and probably came from the Usambara Range.

This race has not been bred ; it probably lays on *Albizzia*.

Charaxes marieps van Someren & Jackson

(Pl. 11, figs. 88 and 89)

Charaxes marieps van Someren & Jackson, 1957 : 50.

MALE. Fore wing length 33–35 mm. *Upperside.* Ground colour black, without any blue sheen in side light. No blue spots in subcostal area but the margin of fore wing with obscured bluish internervular spots. Hind wing black, slightly duller on inner fold. There is a suggestion of a bluish-green post-discal series of lunules from the anal angle to 6, more clearly seen in some specimens. The submarginal row of lilac and whitish spots extends from the anal angle to upper angle ; marginal border greenish-red above upper tail, olive to anal angle. Tails short, fairly robust, of about equal length, 5 mm. *Underside.* Ground colour dark ashy-grey-brown with some satiny reflections in the discal line and upper part of apex of fore wing, and between, a darker brownish band ; a series of dark somewhat indistinct marks in post-discal line increasing in size to tornal black marks. Basal black lines distinct. Hind wing ground colour more brownish than fore, with a satiny bar in sub-basal area ; a darker brown discal bar outlined in black followed by the post-discal zigzag olive and maroon line ; submarginal line of linear marks whitish-lilac, distinct to anal angle ; marginal border maroon above upper tail then greenish to anal angle which carries two black dots.

FEMALE. *Upperside.* Ground colour brownish-black with a strong blue iridescence over base of fore wing and disc of hind wing. The distal portion of the fore wing rather brownish, or even rusty in some specimens. The pattern of the fore wing, especially in discal line, is restricted, the spots being well separated and not expanded to any extent toward the hind margin, consisting of two spots beyond end of cell, the upper large and lower small, a spot at base of 4 set well in, spots in 3–2 larger and arrowhead in shape, spot in upper part 1b oval, the lower spot larger, the spots in 1b may be separate or contiguous, the streak in 1a extended distad. Post-discal spots, three in a row but well in from the rather blunt apex, the spot in 4 only slightly set in so that the angle with above is not strong ; spots in 3–2 slightly larger ; a single or double spot in 1b, the lower free or just touching streak in 1a. All marks are rusty-ochre except those of 1a–1b which are whitish with increasing blue scaling to hind margin. Margin of wing with diffuse indistinct internervular rusty spots. Hind wing ground colour brownish-black at base, strongly black distally ; discal bar comparatively narrow and restricted just reaching subcosta as a separated spot, the rest conjoined and of equal length, but stopping short of the inner fold at 2 ; the band bluish, with a white median bar. The black border is thus wide, but the submarginal linear marks are strong, whitish or slightly tinged lilac distally ; marginal border relatively wide, reddish above upper tail, then olive to anal angle ; extreme edge black. Tails mostly black with median olive streak, robust, the lower often with an upward turn ; upper tail 7 mm. lower 5 mm. *Underside.* Ground colour a strong reddish-brown with satiny highlights on discal line and upper part of apex fore wing ; basal black spots and lines well marked ; discal marks of above here buffy accentuated proximally by black lines ; post-discal spots, though indistinct, have a heavy black line proximally increasing in thickness, and distally in 1b–2 the tornal black marks are strong. Hind wing ground colour reddish-brown with a golden bloom ; black lines at base clear ; the discal bar is hardly indicated except as a narrow angular line accentuated proximally in black. The post-discal zigzag line of maroon and greenish lunules is however strong, outlined proximally in black and more greenish above anal angle. Submarginal, pale line strong up to anal angle, whitish to lilac in colour ; the border well marked and broad, reddish above upper tail olive-green to anal angle. Tails olive with black border.

Variation. (a) In some specimens the distal portion of the fore wing is increasingly rufous toward the margin, and the post-discal spots are somewhat obscured. The hind wing violet-blue band is restricted and narrow especially toward the costa.

(b) This aberration has the ground colour of the fore wing even more brownish, the discal and post-discal spots rusty in colour and there is indication of connecting rays between the discal and post-discal series in the upper half.

Range : This isolated and distinctive species seems to have no near relative and is confined, so far as is known, to the high elevations of Mariepskop in eastern Transvaal.

There is no record of the species having been bred.

Charaxes karkloof karkloof van Someren & Jackson

(Pl. 11, figs. 84 and 85)

Charaxes karkloof van Someren & Jackson, 1957 : 51.

MALE. Fore wing length 33–35 mm. ; general facies very similar to *ethalion*, but apex more pointed, outer border more concave and extreme margin with white fringe widely broken by black interspaces at vein ends. *Upperside.* Ground colour very deep black with only a slight suggestion of greenish-sheen along base of costa ; blue spots limited to two very small subapical dots and one hardly visible diffuse subcostal mark beyond end of cell. Hind wing uniformly black except for a complete row of minute submarginal whitish dots, double at anal angle ; border just above upper tail slightly reddish then mixed with olive to anal angle, rather narrow and often discontinuous. Tails relatively short, slender and straight, 4–5 mm. *Underside.* Ground colour olive-grey-brown with strong satiny highlights especially through the disc of fore wing and upper part of apical area and in between a dark quadrate brownish mark, the brownish colour extending to the outer border in the curve of the wing. Fine black lines toward base of wing and on either side of the lower part of the satiny bar ; submargin often with a series of darker spots extending from apex to tornus where the spots in 1b and 2 are strong. Hind wing slightly more olive-brownish with a rusty bloom in disc but traversed by a slight satiny band in sub-basal area and through disc, both outlined in black ; zigzag post-discal olive and maroon line strong from costa to above anal angle ; submarginal linear marks of lilac-grey ill-defined in upper half but bolder in lower, outlined in black distally, represented on anal angle as two black dots ; marginal border maroon above upper tail then olive to anal angle ; extreme edge narrowly black. There is often a pale " flare " internal to the submarginal line in region of tails.

FEMALE. Fore wing length 36–37 mm. *Upperside.* Ground colour deep brownish-black with strong purply sheen at base in side light ; distal portion of wing blacker. Wing crossed by two rows of spots, discal and post-discal, completely separated even at hind margin ; discal row, two spots beyond end of cell, upper large, lower a small dot, no spot in 4, that in 3 rather angular, spot in 2 larger and free followed by a double mark in 1b, a longer streak in 1a. The upper three spots are orange, the next slightly whitish, the remaining marks forming a long triangle whitish tinged with violet, often strongly. The post-discal spots are strongly orange, the three subapical placed in a row at right angles to the costa, spot in 4 set in a little with spot in 3 in same line that in 2 slightly out, spot in 1b often indistinct or it may be in contact with discal mark. Margin of wing with indistinct orange internervular marks. Hind wing ground colour as fore wing, discal band strong, narrow at costa, represented in 6 by a lilac spot often free from the central whitish bar, which is strongly bordered with lilac especially on the outer border and at tapered end, which does not cross the inner fold. Submarginal row of linear lilac-blue marks, double at anal angle, rather small but distinct ; marginal border strong, reddish above and just below upper tail then olive green to anal angle. Tails long and robust, upper 7 mm., lower 6 mm. and almost entirely black. *Underside.* Fore wing dull drab brown at the base, more rusty in post-discal line then rufous to the border ; slightly satiny in discal line. Black lines at basal area well marked ; discal whitish bar fairly strong and in its lower portion outlined in black on inner border ; post-discal spots rusty and rather indistinct but bordered with black lines on inner edge in 1b–2 ; tornal double black marks edged whitish distally ; margin of wing with obscured darker rusty-brown contiguous marks. Hind wing generally rusty-grey, the basal black lines fine but distinct ; the discal band of above, indicated in the costal half by whitish-buff, but fading out toward middle of disc, but black lined proximally ; post-discal zigzag lines strong, rusty-brown toward costa then more maroon, proximally edged in black ; submarginal line continuous, widest opposite tails, whitish with slight lilac above tails, separated from the reddish and olive border by thin black line ending as double dot in anal angle.

A few years ago Mr. K. Pennington reported to me that he had seen a female ovipositing on a tree in the Karkloof area, but he was unable to hunt for eggs or larvae at the time. He unfortunately did not have the food plant identified. The life history has now been worked out by Mr. Felix van der Riet, assisted by Mr. R. W. Wells of Pietermaritzburg. Ova and larvae were collected from a plant of *Ochna arborea* (Ochnaceae). The larvae were brought through to pupal stage and imagines of both sexes were subsequently obtained.

Mr. Wells kindly sent me colour slides of the egg and larvae, but, as he unfortunately did not make written descriptions at the time, I can only describe the stages from these slides.

Ovum of usual *Charaxes* form, pale ochreous in colour, developing a brownish ring, if fertile, at the junction of the slightly fluted flattened top with the sphere.

Larva. 1st instar, general colour ochre with greenish tinge, anal segment with two brownish-black spines ; head black surmounted by a pair of outer and inner horns and central tubercles also black.

2nd instar : body now greenish covered with fine irrorations pale tipped ; tail, spines divergent, outwardly curved and rufous in colour ; head now rufous, the horns now decidedly rufous, outward and upward curved, and covered in fine tubercles.

3rd instar : general colour stronger green, the body irrorations more pronounced ; the head, twice the size of the previous one, still with rufous horns, the second long pair white tipped ; the disc of the " face " tinged green.

4th instar : body now deep leaf-green, the surface markedly irrorated, each segment with almost luminous blue spots. Ventro-lateral line yellow ; tail spines greenish-ochre. From the slides, there would appear to be no dorsal ornamentation in the majority, but a few may have a yellowish dorsolateral mark on 6th segment.

Head now mostly green with yellow marginal border and black spot at lower angle ; " jaws " blackish ; central short horns rufous at tips, next long pair green at base, rufous at ends, outer pair mostly rufous with green bases.

Pupa : Not figured.

This species has recently been taken in some numbers in the moist sub-tropical forests of the Port St. Johns area, by Messrs. Teare & McMaster and by the latter at Cwen Cwe near Stutterheim. I have examined a series of fresh males and females and cannot detect any difference between these and nominate specimens from Karkloof. There is considerable variation in size amongst the females ; there is also variation in regard to the width of the fore wing discal bar in areas 1a–1b, the mark in 1b may extend distad and so meet the post-discal orange spot in the same area, or it may be well short of it.

The taking of *karkloof* at Port St. Johns at the beginning of 1964 confirms my identification of a pair of this species captured by Mr. C. R. Barrett in the same area in 1961 and sent to me as a variety of *Charaxes ethalion*. Both species fly together in this area, the *ethalion* being a strongly orange-spotted one superficially resembling *karkloof*.

Range : From the high mist forests of Karkloof near Howick, Natal and now known from Port St. Johns and from near Stutterheim.

***Charaxes karkloof capensis* ssp. n.**

(Pl. 11, figs. 86 and 87)

MALE. Fore wing length 35 mm. Shape of wing similar to nominate race, outer border slightly more concave and bluntly dentate, more especially toward the hind angle at 1b–2.

Upperside. Ground colour both wings resembling typical *karkloof*; fore wing with indistinct blue spots, one beyond end of cell and two subapical; the hind wing with small punctiform white submarginal dots, the marginal border narrow and broken. *Underside.* Very similar to nominate, ground colour slightly more greyish, satiny bands strong through discs; dark lines similar, but tornal black spot less well marked; in the hind wing the post-discal zigzag line is indistinct in upper half but stronger toward the anal angle; the submarginal pale line is less defined except in region of tails.

FEMALE. Fore wing length 42 mm., thus larger than nominate, but ground colour and pattern similar, except that the discal fore wing bar is wider in 1a–1b–2, so that the lower portion forms a strong triangular patch which is 12 mm. wide at base and is whitish-lilac with a lilac-blue tinge; the large subcostal spot is ochre. The post-discal spots are relatively small, of about equal size and extend from subapex to 2 with an indistinct spot in 1b, all spots orange-tawny in colour. Hind wing discal band is wide extending from costa to margin of inner fold, whitish towards costa but strongly violet-blue on outer border and lower end; the submarginal linear lilac marks with white central dot well marked from anal angle to upper tail, fade out beyond; marginal border reddish above upper tail becoming olive to anal angle. *Underside.* Rather more greyish than nominate, but with strong brownish on distal border of fore wing and base of hind wing. The distal fore wing bar well represented but tornal black spot less strong and black line in lower post-discal line faint. Hind wing band shows up in upper half but suffused brownish in lower portion; post-discal zigzag olive and maroon line strong at lower end but fades out toward costa; submarginal line whitish-lilac complete, but strongest in region of tails; marginal border comparatively narrow, maroon and olive-green as usual.

Holotype male. SOUTH AFRICA: Cape Province, at Van Staaden's Pass, 22.ii.1963 (*C. W. Wykeham*). In Wykeham collection.

Allotype female. Same data.

Range: Cape Province, Van Staaden's Pass. Swellendam.

Charaxes alpinus alpinus van Someren & Jackson **stat. n.**

(Pl. 12, figs. 90 and 91)

Charaxes ethalion alpinus van Someren & Jackson, 1957: 42.

MALE. Fore wing length 32–34 mm.; shape somewhat falcate, the apex pointed and the outer border concave. *Upperside.* Ground colour velvety black; fore wing immaculate but for two minute subapical blue spots. Hind wing with submarginal white or bluish-white dots, double at anal angle; marginal border slightly reddish above upper tail, then olive to anal angle. Tails short and robust. *Underside.* Ground colour dark greyish-brown with a golden-rusty bloom on distal half of fore wing; a satiny band crosses the disc and the apex is also satiny and in between is a darker brownish zone extending from costa to hind margin and this is bordered by lunate or rounded post-discal dark marks terminating toward the tornus as blackish linear marks, but the tornal spots are faint; the submarginal dark spots are obscured. The basal black marks are strong and accentuated by some white scaling around. Hind wing darker brownish-grey with a slight indication of a discal satiny band; basal black lines faint; post-discal zigzag line of lunate maroon and greenish marks, not very strong in most specimens; submarginal greyish-mauve line fairly well indicated and outlined distally in black; anal angle with two black dots.

FEMALE. Fore wing length 42–45 mm., thus larger than *ethalion* f. *ethalion*. *Upperside.* Ground colour more strongly black, but pattern very similar to *ethalion*, but fore wing bar is narrower, made up as follows: two spots beyond cell end, upper large, lower small; a small dot toward base of 4, set well in, spots in 2–3 sub-basal, that in 2 set in a little, large spot in 1b hardly wider than streak in 1a. Post-discal spots all well marked from the subapex to 1b where the double mark is free or just in contact with the lower portion of discal mark. All fore wing marks are white. Hind wing ground colour black ; discal band wide at costa to mid area, then tapering toward inner fold above anal angle, but not extending through the fold, but there represented by a pale spot ; the band is obliquely white in the disc but shaded blue on the borders. The width at costa is noticeably wider than the discal bar 1a–1b of the fore wing. Submarginal bluish-white linear marks complete and distinct ; marginal border reddish above upper tail, then greenish-olive to anal angle. Tails robust, 6 mm. and 5 mm. *Underside.* Somewhat variable. Fore wing ground colour greyish-brown with satiny sheen over upper part of apex and through the discal zone ; the distal border more brownish in the curve. Basal black marks distinct ; pattern of upperside clearly indicated, strongly marked in some specimens ; tornal dark marks not very strong. Hind wing ground colour generally darker than fore, and brownish tinged but with a sub-basal satiny bar ; discal line usually well marked, so also the zigzag greenish and maroon line of lunate marks terminating in parallel black lines above anal angle ; submarginal pale line, lilac with black outline distally, clearly marked, with double black dot in anal angle.

Variation. Similar to the foregoing in fore wing pattern above, but marks slightly tinged with ochre to 2, marks in 1b–1a white, with slight blue scaling on distal ends. Underside more rufous, especially on hind wing where the discal bar is slightly obscured on its lower portion.

Range : The nominate race occurs on the higher elevations of the Vumba Mts., Rhodesia.

***Charaxes alpinus nyikensis* ssp. n.**

(Pl. 12, figs. 92–97)

MALE. Fore wing length 36 mm., apex rather pointed, out margin slightly concave but wing not strongly falcate. *Upperside.* Deep velvety black on both wings ; fore wing almost immaculate except for two small subapical blue dots and an obscure spot sometimes present in subcosta beyond cell. Hind wing with obscured submarginal bluish spots more apparent in region of the tails, or the spots may be vestigial ; marginal border very narrow, with a slight indication of reddish above upper tail or greenish-olive throughout, then olive at anal angle ; tails short but not so robust as in nominate race from Vumba, black with a trace of green at base and mid-line. *Underside.* Ground colour very dark brown but with a rusty-golden bloom over the distal part of the fore wing ; the discal area crossed by a satiny band, more noticeable at the costal end and separated from the satiny apical triangle by a dark brown quadrate patch. A post-discal dark wavy line runs proximad to a series of darker spots extending from apex to tornus, culminating in the double tornal spots in 1b which are not very heavy. The black basal marks are present but rather obscured by the generally dark ground. Hind wing ground colour darker than fore, and though the pattern is essentially similar to nominate ***alpinus***, it is obscured by the general dark ground colour.

FEMALE. Fore wing length 41–43 mm. *Upperside.* Ground colour brownish-black with strong greeny sheen at base of fore wing in side light. Pattern as in nominate *alpinus*, but spot at base of 4 in discal series large and set well in, thus there is a strong angling of the discal line ; the upper discal marks are whitish, those in 1b–1a shaded with greenish-blue at both ends. Post-discal spots complete to 2, the two upper subapical whitish, the remainder ochreous to orange-ochre ; the angle, formed by the three subapical spots and the spot in 4, is obtuse. In the type specimen there is an indication of a spot in 1b conjoined to the discal mark. Hind wing ground colour as fore with a darker, blacker border. Discal band extends from costa, here rather narrower than in nominate race, but widening over cell area then tapering toward inner fold but not crossing it, above anal angle, though indicated by greyish scaling ; the central area of the band is whitish, the borders strongly shaded with bluish-green or blue scaling.

Submarginal row of linear bluish marks complete ; marginal border reddish above upper tail, then olive to anal angle. Tails in type missing except for left upper, but all tails present in another specimen, upper tail 7 mm. slightly spatulate, lower more slender, 6 mm., black with ochre central line. *Underside.* Ground colour more rusty than in Vumba specimens with a slight golden bloom over the disc, darker brownish on the distal border of fore wing ; basal black lines fine, but obscured in the hind wing. In the type, the discal bar is distinct up to 3, but the post-discal row of spots is obscured though visible and increasingly outlined in black proximally from 3 to 1b ; the tornal black spots large and clear. The hind wing discal band is hardly or very slightly indicated due to the general suffusion of golden-brown over the disc ; the post-discal line of contiguous lunate maroon and olive marks distinct in the type, but obscured in other specimens in varying degree ; the submarginal pale line is obscured but the marginal border of reddish and olive lunules distinct.

Variation. (a) The lower marks of discal bar fore wing and the discal band in hind wing at costa broad and strongly bluish.

(b) The lower marks in fore wing discal bar white, but discal band of hind wing suffused with violet-blue especially on the borders.

Holotype male. Northern Malawi–Zambian border on Nyika Plateau, 29.x.1962 (*C. B. Cottrell*).

Allotype female. Nyika Plateau, 20.x.1962 (*C. B. Cottrell*).

Five additional males and three females were taken in 1963 on the Nyika Plateau. A pair of these will be donated to the British Museum (N.H.).

Range : So far, only recorded from the Nyika Plateau, Malawi.

Nothing is known of the breeding habits of these two races of *Charaxes alpinus*. The genitalia of the two races agree.

Charaxes manica Trimen

(Pl. 13, figs. 98–106 ; Pl. 14, figs. 107–115)

Charaxes manica Trimen, 1894 : 43.
Charaxes etheocles etheocles ♂ f. *cytila* Rothschild in Rothschild & Jordan, 1900 : 484.

The type was described by Trimen (1894 : 42) and the type locality is given as Manica, south-east Africa, i.e. on the border of Rhodesia and Mozambique (P. E. Africa). It was described as a species and based on a female specimen ; two other specimens were taken. Males captured in the same area were assigned to *Charaxes ephyra* Godart and though it was noted that " the underside is darker and with more ferruginous tinge than usual " . . . compared with west coast examples, they were not associated with the female *manica*. This male was subsequently described and named *cytila* by Rothschild in Rothschild & Jordan (1900 : 484), the type locality being Bandawe, Malawi.

The figure of the ♀ type *manica*, depicts the form with the base of the fore and hind wings greeny-blue. Rothschild (1900, pl. 12, fig. 7) figures the form with these areas violet-blue. Both forms and intermediates occur in a long series ; the underside ground colour in all is identical.

When Rothschild & Jordan dealt with this complex group of *Charaxes* in 1900, they were of the opinion that there was insufficient evidence on which to associate males and females as of the same species ; they therefore dealt first with the males, then the females. As a result we find that a male and a female of what we now know to be sexes of the same species, were given different names. They however place *manica* Trimen and *phaeus* Hewitson amongst the female forms of the composite " etheocles ".

Aurivillius in " Seitz " (1911) more or less follows Rothschild & Jordan's grouping.

In 1921 N. D. Riley reported on a collection of butterflies taken in Zambia by H. Dollman ; and under the heading *Charaxes etheocles* Cramer, he (quoting from the field notes and breeding results obtained by Dollman) showed that the male form *cytila* Rothschild was always associated with the female *manica* Trimen, and to a lesser degree ♀, f. *phaeus* (sic) came into the association, for the series of specimens under review contained 20 male *cytila*, 19 ♀ f. *manica*, and 1 ♀ f. *phaeus*. It would appear that Riley accepted Rothschild & Jordan's view that *phaeus* was a form of " etheocles ", and finding a female in the series which appeared to agree with *phaeus*, Hewitson associated this insect with *manica*, as others apparently had done.

In our original attempt to unravel the *etheocles* complex (van Someren & Jackson, 1952), we followed suit, but noted that *phaeus* Hewitson had been described three years earlier than *manica* Trimen, and if the two females were to be associated as belonging to the same subspecies, the name *phaeus* would have to apply, having priority. Further examination of actual *phaeus* material showed that the male of true *phaeus* belonged to the species *viola* and not *etheocles* Cramer and we therefore listed *phaeus* and other female forms under the heading *viola phaeus* (van Someren & Jackson, 1952 : 269). For some unaccountable reason we failed to check the males bred by Dollman, which had been identified as *cytila* by Riley, nor did we examine the type of *cytila* Rothschild. We thus amalgamated two species under the one heading. We discovered our mistake too late to make an alteration to our revision but in our subsequent paper (van Someren & Jackson, 1957 : 42) we rectified our error. We recognized *manica* Trimen as a species, naming the " *phaeus* "-like female, *pseudophaeus* and retained the name *cytila* Rothschild for the male of the species. These forms of *manica* are excellently depicted on Plate VI, figs. 1–3 of Riley's paper.

Though Riley placed *manica* to the species *etheocles*, as accepted at that time, we believe that Trimen was right in describing it as a full species, for the following reasons : (1) the general shape of both male and female differs from *etheocles*, being more robust and compact, and less falcate in the fore wing ; (2) there is an overlap of *manica* with a race of *etheocles* in the north-east part of Angola, in southern Katanga and on the west of Tanzania on the eastern side of Lake Tanganyika. There is also considerable overlap of *manica* and true *phaeus* Hewitson.

It is usually assumed that the advanced forms *manica* and *pseudophaeus* have evolved in mimetic relationship to the male and female forms of the larger species *Charaxes bohemani* Felder, with which they fly in a large part of their range. If we accept the view that both *manica* and *pseudophaeus* evolved to their present pattern and coloration, by natural selection, as a form of protective resemblance, it is of interest to note that although both sexes of the " model " occur in equal numbers, *pseudophaeus* resembling the male of *bohemani* is seldom taken, and indeed appears to be absent in some localities. We have already noted that in the long series bred and taken by Dollman in the Solwezi area of Zambia, there was only one *pseudophaeus* to 19 f. *manica*. In a series of 20 females from Mumbwa, Zambia all are *manica* ; from other sources the following are recorded : 48 *manica* to 12 *pseudophaeus*, 29 *manica* to 6 *pseudophaeus* ; 32 *manica* to 8 *pseudophaeus* ; 18 *manica* to 2 *pseudophaeus*.

The question arises, if the modification of pattern and colour is an evolutionary trend toward a mimetic protective resemblance, why should the female *bohemani* appear to have exerted a greater influence than the male, though both are equally common?

In this regard it is interesting to note that in the case of *viola phaeus* the converse holds good ; if the pattern and coloration are mimetic, it is the male of *bohemani* which has exerted the influence . . . the female not at all!

This brings us to the question, from what were *manica* and *pseudophaeus* derived? Dr. K. Jordan was the first to suggest that the primitive female of *cytila* was " *etheocles* "-like ; this was conveyed in a letter to Prof. E. B. Poulton, who recorded it in his paper (1925 : 542). He drew attention to certain transitional forms which occurred in the Malawi area but they were only briefly referred to and not designated by name. They are the forms *chintechi* and *protomanica*, which are dealt with later.

The original description of *cytila* is very brief and is mainly contained in the " key ". Our reference (van Someren & Jackson, 1952 : 269) is equally brief and confusing, since at that time we failed to distinguish between *Charaxes viola phaeus* and *manica*, but the description given is that of *cytila* and not *viola*. However, I think it advisable to give a full description of the male associated with *manica*.

MALE : Fore wing length 33–34 mm. Shape slightly falcate but not so strongly as in races of *viola* ; outer margin thus concave in 2–4, more so than in *ethalion*, which it otherwise resembles. Hind angle or tornus rather strong. *Upperside*. Ground colour deep black with slight bluish-green sheen in side light, more greenish toward base of costa. Usually two large bluish subapical post-discal spots, well marked or very occasionally obscured, usually one large bluish subcostal mark beyond end of cell and one in cell toward end ; margin with obscured greenish internervular marks ; extreme edge white, strongly divided by dark ends of veins. Hind wing, ground colour deep black, duller on inner fold, the lower part of the disc with a slight greenish sheen extending toward a series of greenish lunules running from anal angle to 5 ; this followed by a complete though rather obscured submarginal series of greenish-blue spots, double at anal angle, occasionally with white centres in region above tails ; marginal border rather narrow, reddish above upper tail, more greenish to anal angle, the band sometimes outlined with bluish scales. Tails comparatively short and fine, 4–5 mm. long, black with central greenish line. *Underside*. Fore wing ground colour, a dark mahogany-brown, the black lines in basal half of wing variable, faint or strong ; the disc of the wing crossed by a lighter satiny band outlined proximally in its lower half by a wavy black line, distally by a darker band extending from costa to 1b, this accentuated in the lower quarter by black in 1b–3, followed by a narrower satiny bar expanded in upper half of apical area ; concavity of wing darker brown, accentuated on inner side by tornal black double spot extending up as a series of diffuse dark submarginal spots ; margin with darker ends to veins ; edge with white scaling often continuous. Hind wing, mahogany-brown with a ferruginous bloom with a slight indication of a satiny discal bar, bordered by darker brown in upper quarter, followed by a series of contiguous lunate greenish-maroon marks from costa to above the anal angle ; submargin with a series of linear lilac marks outlined distally in black in the form of dots, double at anal angle in region of tails ; border maroon above upper tail then olive to anal angle, narrowly edged black ; extreme edge whitish.

There is some slight variation in the underside ground colour, some specimens being more rusty-red than others, but all are dark.

The various forms of the female are now dealt with.

The type female of *manica* depicted by Trimen (1894, pl. vi., fig. 9) is a specimen with an incomplete fore wing white band, the white area stopping short in upper part of 1b, of the greeny-blue phase, the greeny scaling not going right through to the base of the fore wing which is brownish ; the hind wing patch is greeny-blue, not going through to the costa but interrupted by a median black patch. The nominate form is described below.

FEMALE : Fore wing length 36–42 mm. therefore size somewhat variable. *Upperside*. Basal area greenish-blue all over or less green toward base of cell. Curved white band broad, 7–8 mm., commencing at costa and including the upper part of the cell end, the basal area of 3, passing obliquely through the middle of 2 into 1b as a quadrate mark, indented on the inner end or merely as a streak in the upper part ; there may be some white scaling in 1a. Distal portion of wing black, usually with two white or bluish-white subapical spots of the post-discal series ; occasionally the post-discal spots are slightly indicated to 3, usually bluish, rarely white. Hind wing costal and outer border black, the disc with a large bluish-green patch sharply defined on outer border, the blue scaling may go through to the costa but more often stops short in 6–7 or may be represented by a slight extension along the discal and post-discal lines. In the nominate form the submarginal row of linear marks are whitish or bluish and well separated, double at anal angle ; the marginal border more reddish above upper tail, then mixed with olive to anal angle. Tails comparatively long, rather slender, the upper slightly spatulate at end, upper 8 mm., lower 5–6 mm., black, edged with strong olive central line. *Underside*. Base of fore wing dark reddish-brown carrying rather thin black lines ; white band strongly marked to 1b, where the spot is strongly angled ; there is a somewhat triangular satiny patch between the upper part of the band and the paler upper part of the apex, this is followed by indication of the two post-discal spots of above, then by a series of darker spots culminating in the black tornal marks in 2 and 1b ; the concave margin of the wing reddish brown. Hind wing general colour reddish-brown with rather ill-defined black lines ; a slightly darker brown discal bar present followed by the zigzag post-discal maroon and olive line from costa to above anal angle ; submarginal line greyish-blue edged black distally ; border olive-reddish above upper tail, then olive to anal angle ; black dots present above tail area.

Variation. Form figured by Rothschild & Jordan (1900, pl. 12, fig. 7). In these varieties the blue basal area in fore wing and in the hind wing disc may be blue or strongly violet-blue in side light ; in the fore wing the blue may be uniform or dusky at base of cell. The blue in the hind wing seldom goes right through to the costa ; this is usually black or it may be invaded by some blue in the discal and post-discal lines. The submarginal line in hind wing almost obscured and dark blue. The underside is like that of the nominate form, or may be darker, the black lines more strongly indicated.

♀ form *pseudophaeus* van Someren & Jackson, 1957 : 46

This name was given to the "*phaeus*"-like form of *manica*. It occurs in two phases, one in which the base of the fore wing and the disc of the hind wing are strongly blue, the other with these areas greenish blue. It bears a strong resemblance to *phaeus* Hewitson on the upper side, but is much larger and of a different shape ; the underside is much darker. It more or less resembles f. *manica* on the upperside but it lacks entirely the white curved band in the fore wing ; the fore wing post-discal bluish or white spots may be generally more in evidence. The hind wing discal patch may go through to the costa or it may stop at 6 or it may be represented by blue marks in the discal and post-discal lines. The blue patch may be restricted on the outer edge resulting in a wider black border, but it goes through to the base of the wing where it may be slightly dusky. The submarginal line may be clear or ill defined. *Underside.* Similar to *manica* but without the fore wing white bar thus the satiny area is more extended and fills the disc of the wing.

This form is comparatively scarce ; it occurs in the ratio of roughly 1 to 25 *manica*. I have already touched briefly on the curious anomaly regarding the so-called mimetic patterns and coloration of forms *manica* and *pseudophaeus* in relationship to their models, the two sexes of *Charaxes bohemani*. It might be suggested that of the two, *manica* is the more advanced and the more stable genetically, but it is also the more complicated, moreover, primitive forms of both occur in about equal numbers.

I propose to deal now with these primitive forms, to which Jordan drew attention :

♀ form *chintechi* van Someren & Jackson, 1952 : 269

Fore wing length 40–42 mm. *Upperside.* Base greeny-brown shading to greeny-blue to about mid-cell and the proximal border of the discal bar where the blue is brightest ; the distal portion of the wing black, traversed by rows of discal and post-discal spots ; the discal row consisting of two spots beyond the end of the cell, one small spot base of 4 ; spots in 3, 2, 1b and 1a increasing in size toward the hind border ; spot in 3 free, others contiguous and forming a triangle, the inner border almost straight, the spots in 1a and 1b extending distad toward the tornus. The upper spots are ochreous-orange shading to white in 1a and 1b. Post-discal spots orange, the three subapical ones in line, spot in 4 set in, that in 3 directly below or slightly inset, remaining spots extending to 1b hardly visible ; a double whitish spot submarginal at tornus is sometimes present. Hind wing basal area brownish with greeny-blue suffusion becoming bluer on the inner border of discal bar which is whitish and extending right through to the costa but tapering toward anal angle, strongly blue especially on lower part of outer border. Outer black border of wing with a distinct series of linear white marks accentuated with mauve distally ; marginal border dull reddish above upper tail then olive green to anal angle ; extreme edge black ; tails long and fine, 8 and 7 mm. *Underside.* Strongly vinaceous red-brown at base and distal border of fore wing, in between a satiny zone from upper part of apex to hind border between discal and post-discal spots, the former buffy, shading to whitish on hind portion, the latter more strongly buffy-ochreous, distinct in upper section fading out in lower but with a curved black line in 1b opposite the double black tornal mark which is outwardly accentuated with whitish. Hind wing, the patch of upper side here represented by a light buffy-brown irregular band, widest at costa then fading out toward the anal angle. Post-discal zigzag line strong, consisting of contiguous olive-ochre lunules strongly bordered in maroon distally, more greenish above anal angle, outlined in black. Submarginal line well marked, whitish-lilac ; border above upper tail maroon then olive to anal angle carrying black dots, double at anal angle.

Were it not for the strong greeny-blue suffusion over the base of the fore and hind wings, this form would look like a *Charaxes etheocles* female with orange fore wing spots, and even more like a *Charaxes ethalion* female.

Variation. (a) A form in which the fore wing discal and post-discal spots are white, excepting the three subapical, which are orange. The hind wing band wide and strongly suffused with blue-green, thus encroaching on the black border which is narrowed, but the submarginal linear marks are strong.

(b) A form in which the discal and post-discal spots in fore wing are all strongly orange except for a streak in 1a ; the hind wing band narrow and bordered with purply-blue ; the hind wing submarginal line obscured ; the bases of the wings only slightly greeny-blue. This form closely resembles the orange-marked " dry-season " form of female *ethalion*.

♀ form *protomanica* **forma n.**

We mentioned this interesting form in our previous paper (van Someren & Jackson, 1952 : 270) but did not designate it by name. It is a modification of form *chintechi* toward form *manica*.

Fore wing length 40–42 mm. *Upperside*. Base exhibiting a varying degree of greeny-blue or violet-blue suffusion distally circumscribed by a curved white band as in *manica* the costal portion of which is narrowed leaving the two large spots beyond the end of the cell entirely free. These two spots and the post-discal row from subapex to 2 are ochreous. The lower part of the white band in 1a–1b tinged with bluish proximally. Hind wing basal area brownish with a distinct greeny or violet-blue suffusion; disc of wing with a large bluish patch, slightly paler in the discal line extends through to the costa and tapers at the anal end where it merges into the inner fold; black border widest above 5 toward tornus then decreasing toward anal angle. the outer border of the discal patch angled between 4 and 5; submarginal linear marks rather obscured; border as usual, reddish above upper tail, greenish to anal angle. *Underside*. As in *chintechi*, fore wing rather darker at the base, the white bar very distinct and here touches the two spots beyond the end of the cell and in the hind portion there is a dark vertical mark in lower portion of 1b opposite the well marked black tornal spots above which there is a black mark in 2. Hind wing as in form *chintechi*.

Holotype female. MALAWI, Chintechi, 1922 (*T. H. Lloyd*). British Museum (N.H.).

There are six other very similar specimens in the British Museum (N.H.) collection all from Chintechi and this form has recently been taken at Dondo and Amatongas by K. M. Pennington.

Variation. In the most primitive, the costal portion of the curved white fore wing band is very narrow, the two large marks beyond the end of the cell entirely free and strongly orange; the post-discal spots large and orange in colour.

Specimens showing an advance to the *manica* pattern have the costal portion of the white band of fore wing upperside very wide and incorporating the two spots beyond the end of the cell; the hinder portion of the band in 1a–1b rather narrowed by a strong suffusion of violet-blue proximally and over 1a, post-discal spots white in subspex. The hind wing patch is strongly violet-blue and does not extend through to the costa except as dots in the discal and post-discal lines. The submarginal linear marks are distinct.

Range: These forms are recorded from Chintechi and Limbe in Malawi; also from Dondo and Amatongas in Beira area of Mozambique. The species has a very wide range. I have examined material from:

MOZAMBIQUE: Beira, Mzimbita Forest, Dondo, Amatongas.

RHODESIA: Bindura, Umtali, Vumba, Nyamadzi R., Mt. Selinda, Enkeldorn, Sinoia, Salisbury, Bazely Bdg., Odzi R.

ZAMBIA: Mwinilunga, Kitwe, Chingola, Solwezi, Chisamba, Mkushi, Katete, Lusaka, Mumbwa.

MALAWI: Nkata Bay, Manchowa, Chintechi, Limbe, Bandawa.

CONGO REPUBLIC: S. Katanga, Elizabethville, nr. Lake Mweru.

TANZANIA: East shore Lake Tanganyika, Kigoma, Kungwe, Rungwe, Tabora, Morogoro, Newala Ruvuma River.

ANGOLA: Enclave into Zambia. Record from Loanda requires verification.

Charaxes fulgurata Aurivillius

(Pl. 15, figs. 119–123 ; Pl. 16, figs. 124–129)

Charaxes Ephyra Godart var. ; Dewitz, 1887 : 371.
Charaxes fulgurata Aurivillius, 1889 : 236.
Charaxes etheocles etheocles ♀ f. *lunigera* Rothschild in Rothschild & Jordan, 1900 : 488.

This species was first referred to by Dewitz in 1887 as a variety of *Charaxes Ephyra* and the characters of both male and female were mentioned and both sexes were excellently figured. The specimens came from Angola and were taken at Pungo Andongo (9° 45′ S., 15° 40′ E.) by Major von Homeyer.

Aurivillius (1899 : 236) applied the name *fulgurata* to these specimens thus giving them specific rank.

Rothschild & Jordan (1900 : 482–483, 488) refer to these descriptions, the name *fulgurata* being lumped with the comprehensive group of male " *etheocles* ", and the female was given the name *lunigera* and they explain why they think it desirable to apply names to female forms. Briefly, in this particular case, they assumed, because of lack of evidence to the contrary, that the male cited by Dewitz was the male of all three females figured and not of only one of them. However, in this case Aurivillius (1889) cited Dewitz (1887, pl. 17, figs. 10, 11) as types of his *fulgurata* male and female. The name *lunigera* proposed for fig. 11 is therefore redundant. However, Aurivillius in " Seitz " (1911 : 137) accepts the name *lunigera* Rothschild, and this lead was followed by van Someren & Jackson (1952 and 1957). This form resembles *Charaxes manica* ♀ f. *manica* Trimen.

Riley (1921 : 243) described the form *mima* from Zambia. This form resembles *Charaxes viola phaeus*, ♀ f. *phaeus* Hewitson. Riley records and accepts the opinion of Dollman (*in lit.*) that *fulgurata* is a good species distinct from *manica* and *phaeus*. In spite of this, we note that Poulton (1925 : 541) confuses some of the female forms of what he refers to as *etheocles* f. *phaeus* and females of *fulgurata*. Van Someren & Jackson (1952) kept *fulgurata* as a distinct species, but still confused *manica* and *phaeus* ; this however was rectified in van Someren & Jackson (1957).

It seems desirable therefore that a full description of this species be given.

MALE. Fore wing length 32 mm. (average). The shape is much more that of *Charaxes viola* than *ethalion* or *manica* ; the fore wing is falcate with the outer border concave, but not so acuminate as *viola*. *Upperside*. Fore wing, black with a strong green sheen at base, along the costa and on the outer border ; there are large greenish-blue spots in the sub-costal area : one in the cell, one just beyond the cell end, and two subapical ; in addition there is a series of post-discal rather ill-defined greenish marks or lunules extending from 1b to 5, they may be free or just reaching the broad greenish glaucous border of the wing which is divided by the dark veins ; the white fringe is very faint. Hind wing, ground colour black, more brownish on the inner fold. A post-discal row of greenish lunules extends from 5–6 to anal angle, followed by a submarginal row of bluish well separated spots, more whitish in area above the tails, double at anal angle ; border reddish above upper tail, then greenish to greeny-red to anal angle ; extreme margin black with slight white fringe ; tails short but robust, 4–5 mm. *Underside*. Fore wing, dark shiny grey-brown, more tinged with rusty at base and outer border ; black spots in base, strong ; the discal satiny area strong in disc and to post-discal line, paler in upper part of apex ; post-discal line of spots very indistinct but bordered proximally with a thin black line, darker distally to black mark in 1b and ending in the double tornal black spots with one in area above. Hind wing, ground colour grey-brown but flushed with rusty-red ; black lines at base of wing fine but clear, the line through disc turning up above anal angle where there is a pale quadrate mark at the margin ; post-discal bar clearly marked proximally in black, extending from costa to anal angle below the quadrate mark, upper part of bar ochreous to ochre red terminating at anal angle where the double black line is heavier ; submarginal line of spots lilac with black dots ; border reddish then ochre-red ; double black spot in anal angle. Upper tail reddish, lower ochre, both black bordered.

FEMALE. Fore wing length 46 mm. (average). *Upperside.* Base of wing brownish-grey heavily scaled with pale blue, more strongly blue toward the discal white bar, the blue scaling extending into the bar in 1a and partly into 1b. The bar is comparatively wide, 10 mm. at costa where it includes the cell end and bases of 5–7 extending to 2 then is rather angled distally at upper part of 1b and goes to the hind border, where it is suffused with blue. The distal half of the wing is black, slightly paler on the border, carrying two large whitish or bluish subapical spots, sometimes a third in upper post-discal line and extending down to 3 as more diffuse indistinct spots. The type female shows the subapical marks as angled, a character more often noted in the form *mima*. Hind wing ground colour greyish at extreme base and on inner fold, disc of wing with a large pale blue patch, somewhat triangular in shape, base toward inner fold, the upper side not reaching the costa except as two ill-defined spots in discal and post-discal line ; border of wing black, widest at upper angle, carrying submarginal linear marks, well marked or ill-defined, lilac or bluish in colour slightly more whitish toward anal angle ; border above upper tail reddish, then more olive to anal angle. Tails rather slender, 6–7 mm. long, black with central light line. *Underside.* Rather darker brown than male and with more rusty suffusion ; fore wing with white bar distinct, and the subapical spots well reproduced ; the black tornal spots larger and clearer. Hind wing pattern similar to that of the male rather more suffused with brownish, but the post-discal maroon and olive lunules more distinct.

This form bears a resemblance to the female of *Charaxes manica* and is slightly like the female of "*Charaxes vetula*" Rothschild.

♀ form *mima* Riley, 1921 : 243

(Pl. 16, figs. 126 and 127)

There are three variants of this form ; the nominate form being dominant.

Fore wing length 34–36 mm. *Upperside.* Basal portion light greeny-blue as in f. *fulgurata*, the distal border forming an irregular curve from just short of the end of the cell to the hind margin in the discal line ; a blue spot in the cell may be free or contiguous with the basal blue. The distal portion of the wing, i.e. a little more than half the area, is black, slightly paler glaucous from apex to hind angle of border ; the subapical post-discal spots are large, light greeny-blue or even whitish and are usually angular, apex directed inward, or V-shaped, followed by a series of lunate marks to 1b, the ends of the marks often touching the glaucous border marks. Hind wing with a large pale bluish-green basal patch greyish at the inner fold, not reaching the costa on the upper border but here represented by blue marks in the discal and post-discal lines, the marks may be free or joined to the patch ; the outer border of which may be evenly or irregularly curved ; border of wing black, widest at upper angle, decreasing gradually towards anal angle ; submarginal linear marks usually clear, bluish or greeny-blue, whitish at the double spot at anal angle. Marginal border reddish to between tails, then mixed with olive-green to anal angle, internally accentuated by brighter green ; double spots at anal angle black ; extreme margin black. Tails rather slender, upper 5 mm., lower 3–4 mm., reddish or greenish with black edging. *Underside.* Base and disc of fore wing usually strongly satiny, paler at upper part of apex but border in curvature reddish-brown ; a slight indication of an interrupted darker band beyond post-discal line terminating in black spots or in a line in 1b, with a double tornal black mark beyond. Basal black lines may be fine or obscured. Hind wing, ground colour rather browner than fore, with a slight indication of satiny areas toward base of costal area ; basal black lines thin or may be obscured ; post-discal row of reddish and olive lunate marks usually distinct or may be faintly indicated ; a pale triangular mark usually present above anal angle ; beyond the post-discal line there may be some greyish-blue scaling internal to the submarginal series of contiguous lunate greyish or lilac marks ; marginal border reddish then olive-ochre above anal angle.

Variation. (a) A minor variation in which the fore wing outer border is broadly greyish, especially at apex, almost reaching the post-discal row of light spots. The hind wing also exhibits a greying of the distal border.

(b) In this variation the basal blue of fore and hind wings is a deep greeny-blue and rather restricted in extent ; the distal half of the fore wing is velvety black, the subapical post-discal spots greenish-blue and the remainder of the series greenish and hardly visible. In the hind wing the discal blue does not extend beyond area 5 on upper border. The underside is darker than usual and more mahogany in colour so that the lines and bars are obscured.

Range : The type was described from Pungo Andongo in Northern Angola. The species ranges eastward into Katanga (south), the two portions of Zambia and the N.W. of Rhodesia ; the distribution is thus somewhat restricted.

In the introductory remarks mention was made of the confusion surrounding this species, largely due to the lack of field knowledge of the species concerned. Dollman was the first to study *fulgurata* along with *manica* in the field, and his observations were made public by Riley (1921). However, we note that Poulton (1925 : 541) considered *mima* Riley, a female form of *fulgurata*, to be the same as female form *coryndoni* Rothschild, which is a female form of *Charaxes viola phaeus*. The mistake is understandable, for these female forms are confusingly alike, but on the evidence of Dollman's careful observations the mistake should not have been made.

It will be seen from the distribution map E that *fulgurata* flies in some of the territory occupied by *Charaxes manica* and *Charaxes viola phaeus* and also *Charaxes bohemani*. It is generally believed that both sexes of *bohemani* act as " models " for these very similar species. Both sexes of *bohemani* are equally common and one would expect them to be equally effective as " models ". It is interesting to note that the female form *mima* of *fulgurata* is by far the commoner, the proportions being 20 *mima* to 1 *fulgurata*. All 15 females taken or bred by Dollman are f. *mima*.

Charaxes gallagheri van Son

(Pl. 15, figs. 116–118)

Charaxes gallagheri van Son, 1962 : 146 [♂.]
Charaxes gallagheri van Son ; van Son, 1963 : 9 [♀].

Recent research has revealed that the female of this species was actually described in 1957 by van Someren & Jackson but was erroneously placed to *Charaxes aubyni australis*. The specimen had been taken by B. D. Barnes (1934) in the Umtali area of the Vumba district in Rhodesia, thus actually outside the range of *aubyni australis* which is now restricted to Malawi and southern Tanzania.

Vide comments under that species.

Very few examples of this interesting species had been obtained up to the time Dr. G. van Son published his descriptions, and all but one were males. Males have now been taken in some numbers by various collectors, but only a few females have been trapped, mostly by Dr. C. B. Cottrell. All specimens have come from a relatively small area of central-eastern Rhodesia in the triangle Salisbury–Umtali–Fort Victoria, and mostly from the Odzi River area.

The original descriptions are very full and I propose to give only a condensed version to accompany the illustrations which form an integral part of the present series of Revisions.

MALE. Fore wing length 32–33 mm., shape rather falcate, outer margin strongly incised and apex pointed, thus somewhat like *Charaxes viola*. *Upperside*. Ground colour blue-black with bluish-green sheen at base, costa slightly brownish. A subcostal blue spot toward end of cell; in the discal row an elongate whitish mark in 6 with a smaller spot in 5 followed by a more obscured spot in 3 and an indication of a spot in 2; post-discal series complete: three subapical spots in a row all white, spots in 4–3 set in, thus forming an angle with subapical row, also white, spots in 1b–2 larger, less defined and bluish; margin with large glaucous internervular marks from apex to hind angle, that in 1b double; fringe white between veins. Hind wing ground colour blue-black, slightly greyer on inner fold; costa with a large white mark in discal line with a smaller spot below; post-discal row of contiguous greenish spots distinct from 5 to above anal angle; submarginal row of linear whitish spots edged blue distally, complete from upper angle to anal angle; admargin with greenish-blue lunate marks from anal angle to above upper tail, where there is an admixture of dull reddish scales; margin black, with white fringe between veins; tails black with central greenish line, upper 5 mm., lower 4 mm. *Underside*. Fore wing ground colour silvery-greyish, slightly brownish on distal third, especially in the curvature of the margin. The basal markings are: three black dots towards base of cell, a zigzag black line just beyond mid area of cell, end of cell narrowly black, two slight black lines basad in 5, one sub-basad in 4, two lines well separated sub-basad in 1b and 2. Post-discal row of spots of above indicated below and outlined proximally in black in 1b–3; submarginal black present from 4 to tornus, strong in 1b and 2 but fading out above; margin with fuscous shading in curvature. Hind wing ground colour silvery-greyish with fine black lines in basal area and on discal line on inner border of the silvery bar which extends from costa to above anal angle where the bar expands into a triangle, followed by a zigzag brownish post-discal bar carrying fine black crescentic lines; submarginal row of whitish marks complete from upper angle to above anal angle; margin greenish at anal angle to upper tail then slightly reddish, and with black dots between especially marked at anal angle.

The foregoing description is based on a specimen taken by H. J. Duke at Chriten Bank, and is almost identical with the type (Pl. 15, fig. 116).

Variation. The fore wing spots may be smaller and more strongly blue and those of the hind wing smaller and bluer, the costal spots smaller; the marginal glaucous marks less strong (Pl. 15, fig. 117). Conversely, a specimen may have the fore wing spots larger and whiter, and the glaucous marginal spots very marked; the hind wing pattern stronger on a more greeny-black ground.

FEMALE. Fore wing length 40 mm., apex rather pointed, outer margin slightly incised, more so than in *Charaxes ethalion* ♀ f. *ethalion*, to which it bears a superficial resemblance; it resembles more the female of *Charaxes aubyni australis* in shape and pattern. *Upperside*. Ground colour of fore wing black, slightly more brownish at base, with some greenish sheen in side light. There is a bluish spot in upper portion of cell end which may be very conspicuous (as in the type), or obscured; discal spots: one elongate in 6 followed by a smaller one in 5, no spot or only a suggestion of one in 4, spots from 3 to hind margin increasing in size to long streak in 1a; post-discal spots comparatively large, three subapical rather transverse elongate, spot in 4 more rounded and set in, spots in 3–2 elongate vertical, double spot in 1b contiguous with discal mark, all spots creamy-white with slight bluish-green scaling on distal ends in 1b and 1a; marginal border without marks except for obscure greyish-blue streaks in 1b at tornus. Hind wing ground colour as fore, or slightly blacker on distal third; discal band wide, extending from costa to inner fold above anal angle, fairly uniform in width but tapering above anal angle, white or creamy-white with greeny-blue scaling on borders; there is an obscure bluish spot subcostal and more basad to the band. Submarginal linear whitish marks complete from upper angle to anal angle, the double spot at anal angle with some bluish-violet on distal edge; marginal lunules greenish from anal angle to upper tail, then with admixture of reddish to 5. Tails black with median whitish streak; edge of wing black with some white cilia, especially toward anal angle; upper 7 mm., lower 5 mm. *Underside.* Silvery-greyish as in the male but with rather more brownish in spaces between discal and post-discal lines of whitish spots and browner in marginal curvature of fore wing. Black spots and lines as in the male but larger. Hind wing silvery greyish at base followed by a more brownish band proximal to the conspicuous white discal band; the distal border of the band also brownish bordered by the zigzag line of contiguous greenish-grey lunate marks outlined in black proximally and by dull reddish distally; submarginal row of silvery-grey marks complete but rather diffuse but with black marks distally extending from upper angle to anal angle; above upper tail the marginal lunules are reddish, then greenish to anal angle.

This description is based on a specimen from Chriten Bank taken by C. B. Cottrell.

Range: Apparently confined to central-eastern Rhodesia.

The position of *gallagheri* within the general *etheocles* s.l. complex is uncertain. The underside ground colour and general pattern is reminiscent of *Charaxes contraria* Weymer of the Tanzania and Kenya Coast belt; and even more so of *Ch. martini* described below of S. Malawi, but the uppersides are quite different. The pattern above resembles somewhat that of *Charaxes guderiana*, which lacks the white costal spot of hind wing; there is also a superficial resemblance to *Charaxes etesipe tavetensis*, which usually has the white costal mark, but these species should not be confused.

The species has not yet been bred.

***Charaxes martini* sp. n.**

(Pl. 16, figs. 130, 131)

The recent discovery of this species adds yet another to the " Complex of Black Charaxes " (males) of Eastern Africa.

In general shape it resembles *Charaxes viola phaeus* and *Charaxes contraria* Weymer, the fore wings being pointed and falcate. The upper side is black with very limited markings; the underside is silvery greyish in ground colour, thus totally different to *viola phaeus*, but resembling *contraria* and the recently described *Charaxes gallagheri* van Son in this respect.

MALE. Fore wing length 30 mm., apex pointed, and falcate. *Upperside.* Ground colour deep black with a slight greenish sheen toward base; pattern limited to a very small blue spot, in subcosta beyond end of cell, one distinct though small white spot in mid-subapical row, with just the suggestion of bluish marks above and below in this line; margin of wing with traces of internervular greenish streaks, extreme edge with white cilia widely broken by black on veins. Hind wing, ground colour deep black but with a strong greenish suffusion over the lower part of the disc, directly internal to a row of strongly marked greenish post-discal spots, largest in 2 decreasing in size to 5; this is followed by a very distinct row of white elongate marks, double at anal angle and extending to upper angle ; border with a wide band, a mixture of reddish and greenish scaling above upper tail, then olive to anal angle ; extreme margin black with slight white fringe between veins. Tails of about equal length, 4–5 mm. ; the anal lobe rather pronounced ; margin of wing bluntly dentate. *Underside.* Ground colour silvery light greyish, the black marks in basal half of fore wing strong ; the discal bar silvery proximally outlined in black ; beyond a broad brownish band from costa to hind margin, first faintly then more heavily black lined in 1b opposite the tornal black mark, which is elongate and extends slightly into 2 ; the concavity of wing shaded brownish. Hind wing, ground colour silvery, black lines in basal area distinct ; a long thin line from costa, double in cell, runs from costa towards the anal angle, then curves up to the inner fold ; this line borders the discal silvery bar which runs from costa to above anal angle, which in turn is followed by a brownish band, on the distal side of which are pale olive-green contiguous lunate marks in the post-discal line, bordered distally with brownish and carrying the submarginal series of white to lilac linear marks accentuated distally in black ; border reddish above upper tail, then pale olive to anal lobe with double black mark.

Holotype male. MALAWI: Mlosa stream, Mlange, 2,500 ft., 23.ix.1962 (*P. T. Martin*). To be deposited in British Museum (N.H.).

In some respects this insect resembles *Ch. contraria* Weymer, of the coastal belt of Tanzania and Kenya and may eventually prove to be a subspecies of it, but until more examples are obtained, including females, it seems best to describe it as a species. It should be noted that *contraria* has previously been treated as a subspecies of *Charaxes catachrous* of Congo–Uganda, but this now appears incorrect, for reasons which will be given when the *etheocles* group is dealt with.

Range : Only known from the foot hills of Mt. Mlange (Mlosa Stream), Malawi.

SYSTEMATIC LIST

Charaxes berkeleyi van Someren & Jackson[4]

Charaxes berkeleyi van Someren & Jackson, 1957. Type locality : Kenya, Ngong area. Range : In Kenya, mostly east of the Rift Valley.

Charaxes aubyni van Someren & Jackson

Charaxes aubyni aubyni van Someren & Jackson, 1952. Type locality : Dabida Mt. 100 miles W.N.W. of Mombasa. Range : Kenya, Teita, Mbololo and Sagala hills and Tanzania on Mt. Kilimanjaro, Monduli, Usambara range and Unguru Mts.

♀ f. *ochrefascia* van Someren & Jackson, 1957. Type locality : Teita hills.

ecketti van Someren & Jackson, 1957. Type locality : Kenya, Ngong. Range : Kenya in Nairobi-Ngong and Kikuyu areas to the Aberdares, Mt. Kenya, Mau, Sotik and Upper Mara River.

♀ f. *ochretincta* van Someren & Jackson, 1957. Type locality : Kenya, Ngong.

australis van Someren & Jackson, 1957. Type locality : N. Malawi, Nyamkowa Mt. Range : Malawi, Mt. Mlange etc., Blantyre, Limbe, Zomba and Nyika plateau. In Tanzania in the southern highlands.

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[4] See footnote on p. 74.

Charaxes marieps van Someren & Jackson

Charaxes marieps van Someren & Jackson, 1957. Type locality: Transvaal, Mariepskop. Range: Confined to eastern Transvaal.

Charaxes karkloof van Someren & Jackson

Charaxes karkloof karkloof van Someren & Jackson, 1957. Type locality: Natal, Karkloof. Range: Natal, in high forests of Karkloof, Port St. John's and Stutterheim.

capensis ssp. n. Type locality: South Africa, van Staaden's Pass. Range: Only known from area of type locality.

Charaxes alpinus van Someren & Jackson

Charaxes alpinus alpinus van Someren & Jackson, 1957. Type locality: Rhodesia, Vumba Mts. Range: Only known from the higher elevations of the Vumba Mts., Rhodesia.

nyikensis ssp. n. Type locality: Malawi, Nyika plateau. Range: Only recorded from area of type locality.

Charaxes manica Trimen

Charaxes manica Trimen, 1894. Type locality: Mozambique, Manica. Range: Occurs in many localities in Mozambique, Rhodesia, Zambia, Malawi, Tanzania, Congo Rep. and Angola.

♀ f. *pseudophaeus* van Someren & Jackson, 1957. Type locality: Mozambique, Beira.

♀ f. *chintechi* van Someren & Jackson, 1952. Type locality: Malawi, Chintechi.

♀ f. *protomanica* forma n. Type locality: Malawi, Chintechi.

Charaxes fulgurata Aurivillius

Charaxes fulgurata Aurivillius, 1889. Type locality: Angola, Pungo Andongo. Range: Angola, Congo Rep., Zambia and N.W. Rhodesia.

Synonym: *Charaxes etheocles etheocles* ♀ f. *lunigera* Rothschild in Rothschild & Jordan, 1900. Delagoa Bay, Zomba and Taveta.

♀ f. *mima* Riley, 1921. Type locality: Zambia, Solwezi.

Charaxes gallagheri van Son

Charaxes gallagheri van Son, 1962. Type locality: Rhodesia, Mapembi (Umtali dist.). Range: Confined to central-eastern Rhodesia.

Charaxes martini sp. n.

Charaxes martini sp. n. Type locality: Malawi, Mlanje. Range: Only known from the type locality.

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The task of compiling these revisions has not been an easy one, and I am greatly indebted to the many who have assisted me with specimens, photographs and valuable information. I wish especially to place on record my thanks to members of the Entomological Department of the British Museum (N. H.), particularly Mr. N. D. Riley and Mr. T. G. Howarth ; to Mr. Ernest Taylor of the Hope Department of Entomology, Oxford University Museum ; Dr. G. Bernardi of the Paris Museum ; Dr. G. van Son of the Transvaal Museum, Pretoria and Dr. Elliot Pinhey of the National Museum, Bulawayo ; to Dr. C. B. Cottrell of the University College, Salisbury ; to Mr. J. D. Handman of Malawi ; to Mr. K. M. Pennington of Balgowan, Natal ; Mr. J. Lawson of the Natal Museum, Durban ; Dr. C. H. McCleery of Njombe, Tanzania ; Dr. Arthur Rydon of Arusha, Tanzania ; Mr. T. H. E. Jackson of Kitale, Kenya ; Mr. R. H. Carcasson of the National Museum, Nairobi, Kenya, for access to the material taken by the Japanese Expedition to Kigoma, Tanzania ; to Mr. Barton Eckett and Mrs. Joan Wedekind for Zambian specimens and lastly to Dr. A. de Barros Machado of Museum do Dundo, Luanda, Angola, for useful Angolan material.

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For AURIVILLIUS, C., in SEITZ, A., 1925, read AURIVILLIUS, C., in SEITZ, A., 1911.

INDEX

Synonyms in italics

abyssinicus, 61, 69
alpinus, 84, 98
antanala, 68
aubyni, 74, 77, 97
australis, 79, 97

berkeleyi, 74, 97

cacuthis, 68, 70
caeruleotincta, 69
capensis, 83, 98
castoroides, 69
chintechi, 90, 98
cytila, 86

dealbata, 66, 69
ecketti, 78, 97
etesipe, 59, 69
etheta, 59, 69
evansi, 74 (footnote), 75

flavus, 69
fulgurata, 92, 98

gallagheri, 94, 98
gordoni, 63, 69

karkloof, 81, 98

lunigera, 93, 98

manica, 86, 98
marieps, 80, 98
maritima, 52, 54
martini, 96, 98
melloni, 52, 53, 54
meru, 53, 54
mima, 93, 98

nyikensis, 85, 98

ochrefascia, 97
ochretincta, 79, 97

paradoxa, 67, 70
patrizii, 62, 69
peculiaris, 65, 69
pemba, 64, 69
pembanus, 70, 74
penricei, 65, 69
protomanica, 91, 98
pseudophaeus, 89, 98

tanganyikae, 67, 70
tavetensis, 62, 69

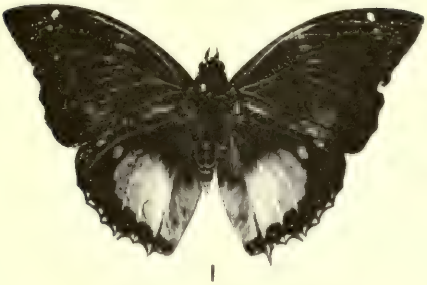
usambarae, 73, 74

violetta, 47, 50, 54
violetta transitional form, 51

PLATE 1

Charaxes violetta violetta Grose-Smith

FIGS. 1, 2. Type ♂ (Mozambique : Delagoa Bay), B.M. (N.H.) upper and underside.
FIGS. 3, 4. Topotypical ♂ and ♀ (Mozambique : Delagoa Bay), upper and undersides.
FIGS. 5, 6. Type ♀ (Mozambique : Delagoa Bay), B.M. (N.H.) upper and underside.
FIGS. 7, 8. Topotypical ♂ and ♀ (Mozambique : Delagoa Bay), upper and undersides. Note variation on undersides.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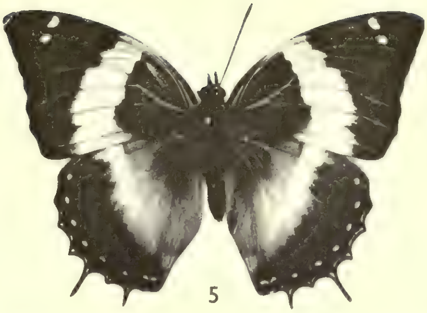
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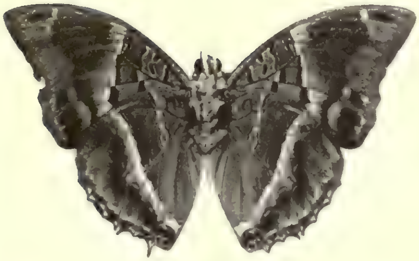
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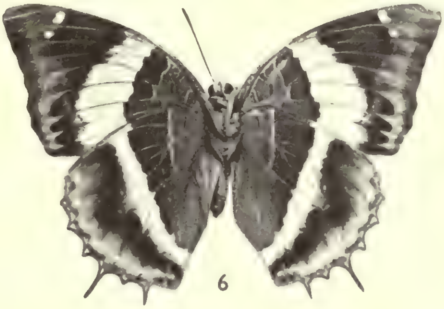
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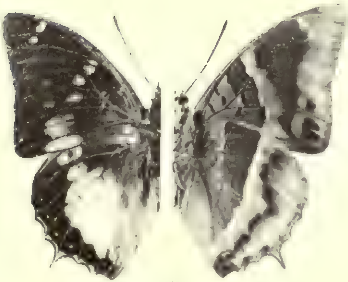
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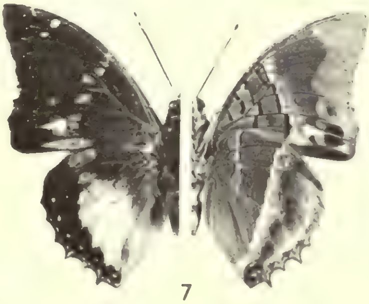
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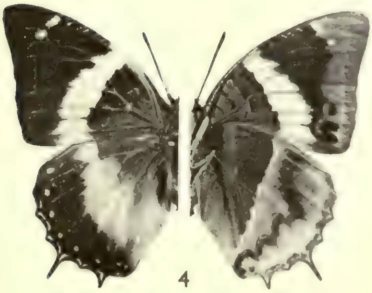
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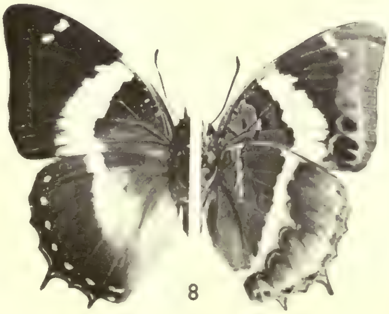
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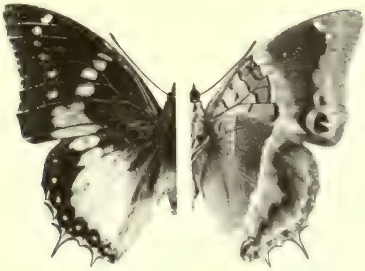
PLATE 2

Charaxes violetta Grose-Smith

Fig. 9. ♂ transitional (Vumba Mts.) upper and underside.
Fig. 10. ♂ (Malawi: Monkey Bay, 1,600 ft.), Handman, upper and underside.
Figs. 11, 12. ♂ (S. Tanzania: Newala, north of Ruvuma River), upper and undersides.
Fig. 13. ♀ transitional (Vumba Mts.) upper and underside.
Figs. 14, 15. ♀ (Malawi: Nkata Bay, 1,900 ft.), Handman, upper and undersides.
Fig. 16. ♀ (Cent. Tanzania: Kimboza Forest nr. Morogoro), upper and undersides.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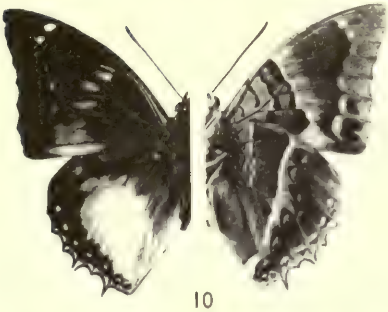
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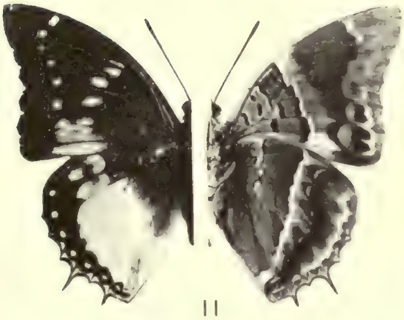
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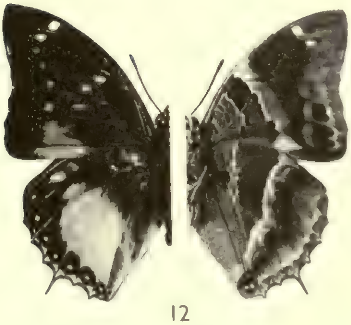
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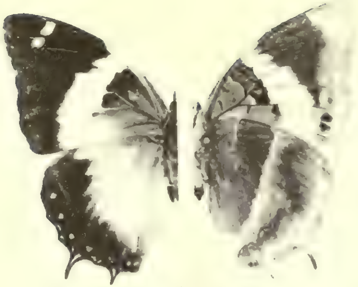
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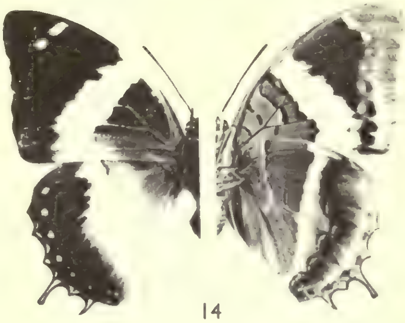
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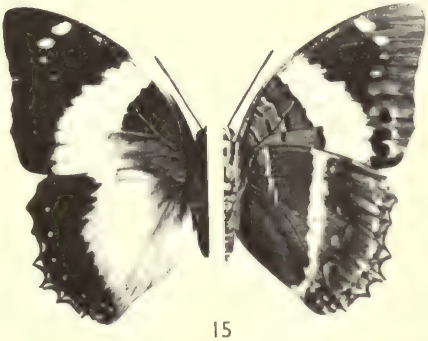
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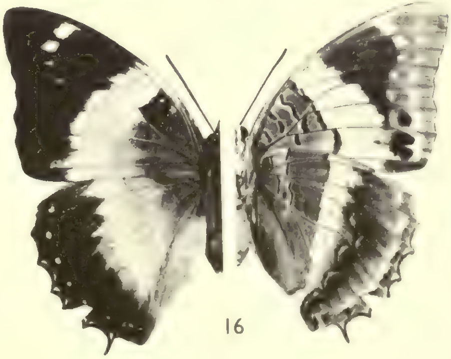
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PLATE 3

Charaxes violetta Grose-Smith and subspecies

Fig. 17. *violetta* Grose-Smith, ♂ (Tanzania : Iringa Dist., Kitonga Gorge), upper and underside.

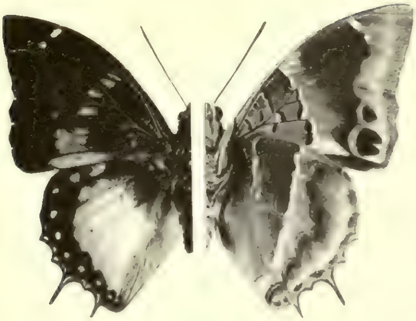
Fig. 18. *violetta* Grose-Smith, ♀ (Arusha, N.W. of Kilimanjaro), upper and underside.

Figs. 19, 20. *maritima* ssp. n., Type ♂ (Kenya Coast, Rabai Hills) and ♂ (Usambara Hills, Lower forest below Amani), upper and undersides.

Fig. 21. *violetta* Grose-Smith, ♀ (Tanzania : Iringa Dist., Kitonga Gorge), upper and underside.

Figs. 22, 23. *maritima* ssp. n., ♀ and Type ♀ respectively (Kenya Coast : Rabai Hills), upper and undersides.

Fig. 24. *maritima* ssp. n., ♀ (Usambara Hills, Lower forest below Amani), upper and underside.



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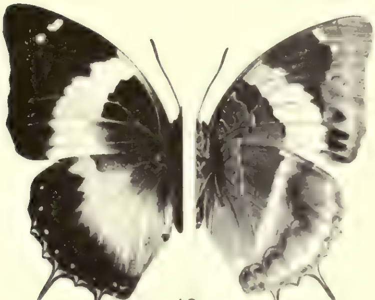

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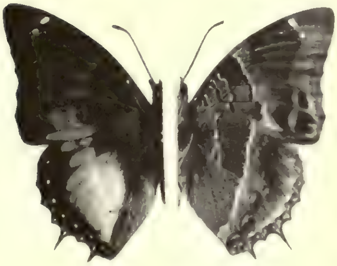

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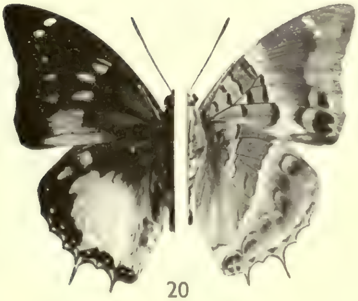

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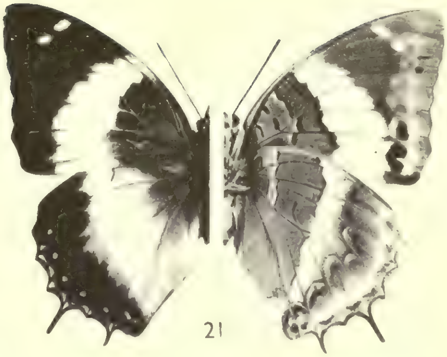

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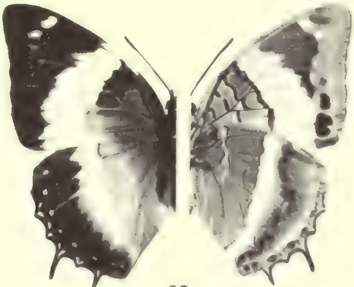

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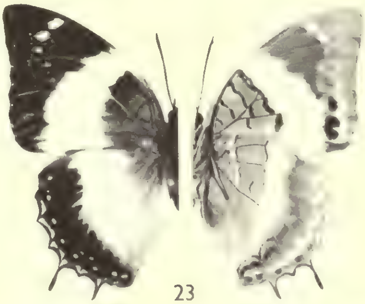

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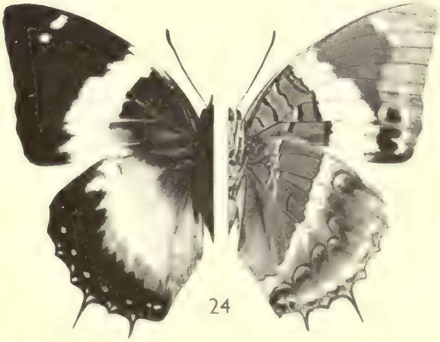

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PLATE 4

Charaxes violetta Grose-Smith and *Ch. etesipe* (Godart)

FIGS. 25, 26. *violetta meru* ssp. n., ♂ (Mt. Kenya, Lower forest, Meru), upper and undersides.

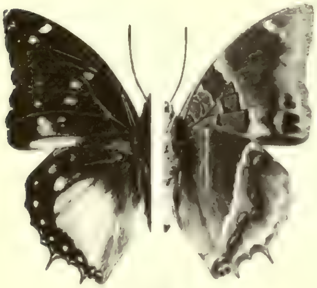
FIG. 27. *violetta melloni* Fox, Holotype ♂ (Tanzania : Nguru Mts., Morogoro Dist.), upper and underside.

FIG. 28. *etesipe etesipe* (Godart), topotypical ♂ (Sierra Leone), upper and underside.

FIGS. 29, 30. *violetta meru* ssp. n., ♀ (Mt. Kenya, Lower forest, Meru), upper and undersides.

FIG. 31. *violetta melloni* Fox, Allotype ♀ (Tanzania : Nguru Mts.), upper and underside.

FIG. 32. *etesipe etesipe* (Godart), topotypical ♀ (Sierra Leone), upper and underside.



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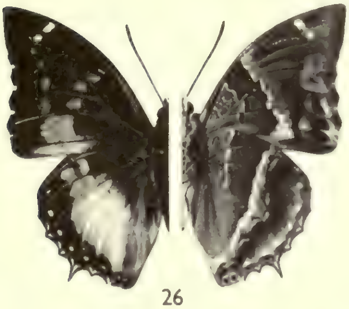

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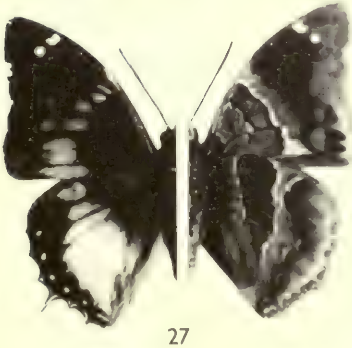

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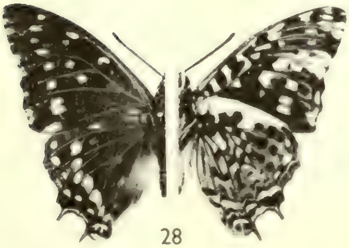

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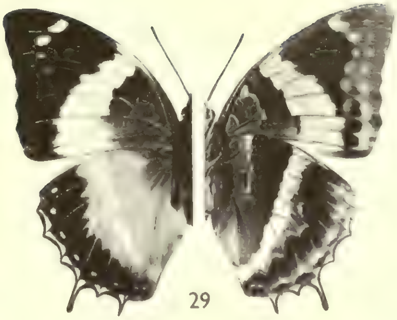

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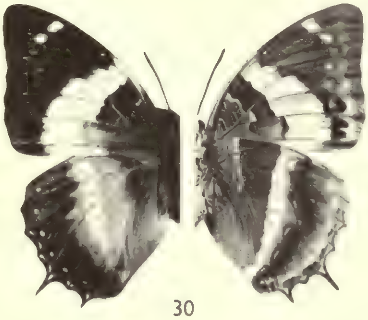

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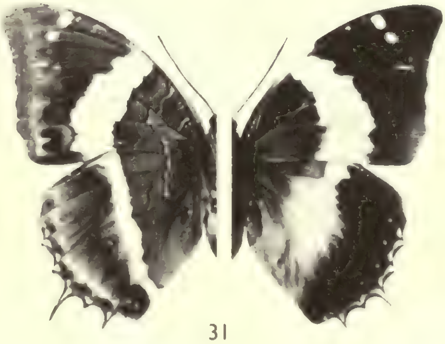

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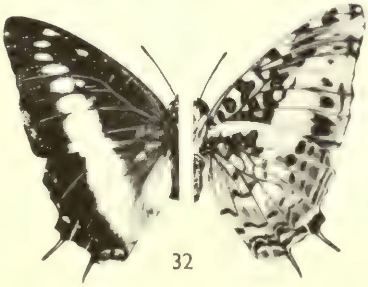

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PLATE 5

Charaxes etesipe (Godart) and subspecies

FIG. 33. *etesipe* (Godart), ♂ (Uganda : Katera forest, W. side L. Victoria), hind wing costa with large white patch ; post-discal blue band broad, upper and underside.

FIG. 34. *etesipe* (Godart), ♂ (S.W. Uganda : Kayonza forest), hind wing costa with one small costal spot ; post-discal blue band narrow, upper and underside.

FIG. 35. *etesipe* ♀ f. *caeruleotincta* Carpenter, Type ♀ (Uganda : Entebbe). (Hope Dept., Oxford).

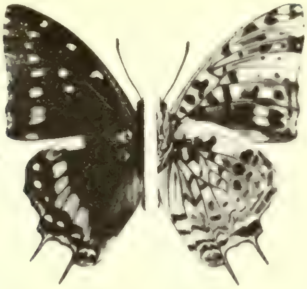
FIG. 36. *abyssinicus* Rothschild, ♂ (Abyssinia : Youbdo, Ungemach) upper and underside. (Photo Paris Museum).

FIG. 37. *etesipe* ♀ f. *casteroides* Poulton, (Uganda : Jinja), fore wing bar strongly ochre ; hind wing band white at costa but ochre with greenish distal border, upper and underside.

FIG. 38. *etesipe* (Godart), ♀ (Nigeria : Calabar), a similar form to *caeruleotincta* Carpenter, upper and underside.

FIG. 39. *etesipe* ♀ f. *caeruleotincta* Carpenter, Paratype ♀ (Uganda ; Entebbe). (Hope Dept., Oxford).

FIG. 40. *abyssinicus* Rothschild, ♀ (Abyssinia : Youbdo, Ungemach), upper and underside. (Photo Paris Museum).



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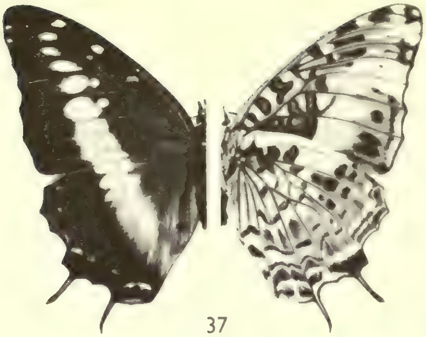

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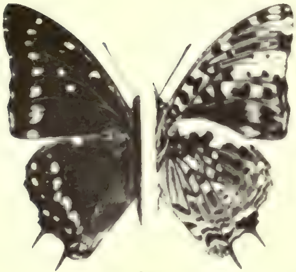

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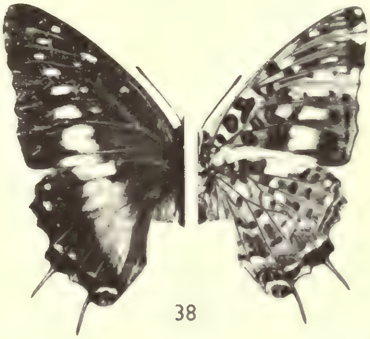

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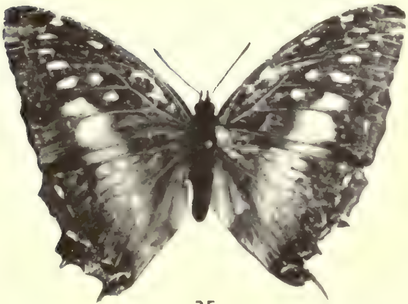

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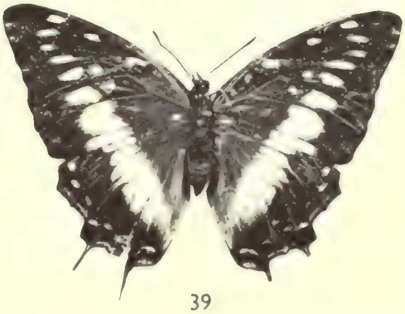

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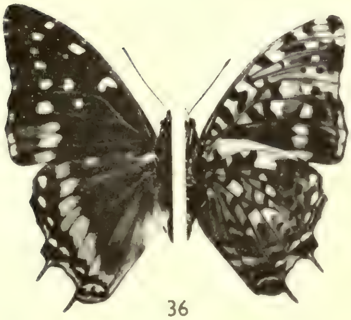

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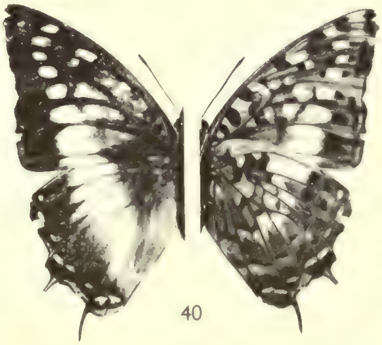

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PLATE 6

Charaxes etesipe (Godart) subspecies

FIG. 41. *tavetensis* Rothschild, ♂ (Kenya : Teita Hills, A. Rydon), fore wing spots small ; hind wing blue band rather restricted and not extended towards tails, upper and underside.

FIG. 42. *tavetensis* Rothschild, ♂ (Kenya : Rabai Hills), hind wing band extended toward area of tails ; fore wing spots small ; marginal spots large, upper and underside.

FIG. 43. *gordoni* van Someren, topotypical ♂ (Mt. Kenya, Lower Meru forest), upper and underside.

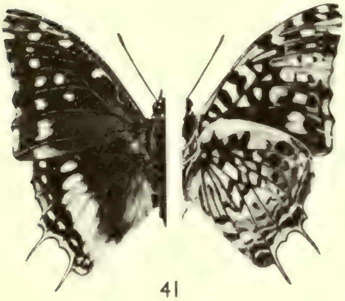
FIG. 44. *pemba* ssp. n., ♂ (Pemba Is. north of Zanzibar, A. Rydon), fore wing strongly acuminate ; hind wing blue band broad, upper and underside.

FIG. 45. *tavetensis* Rothschild, ♀ (Kenya : Teita Hills, A. Rydon), fore wing bar ochre and white ; hind wing band white, upper and underside.

FIG. 46. *tavetensis* Rothschild, ♀ (Kenya : Rabai Hills), fore wing bar creamy, upper spots white ; hind wing band white with slight greeny-blue borders, upper and underside.

FIG. 47. *gordoni* van Someren, topotypical ♀ (Mt, Kenya, Lower Meru forest), upper and underside.

FIG. 48. *pemba* ssp. n., ♀ (Pemba Is.), fore wing bar white ; hind wing band white with greeny-blue on borders, upper and underside.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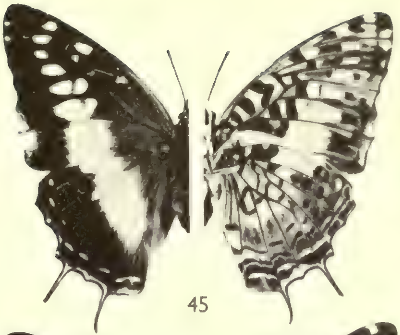
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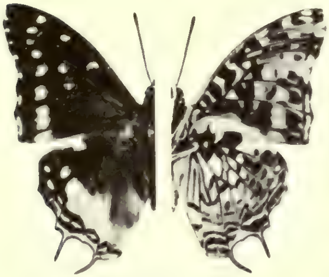
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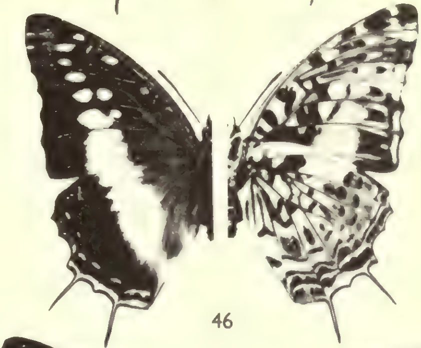
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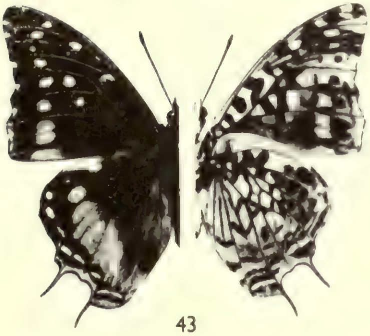
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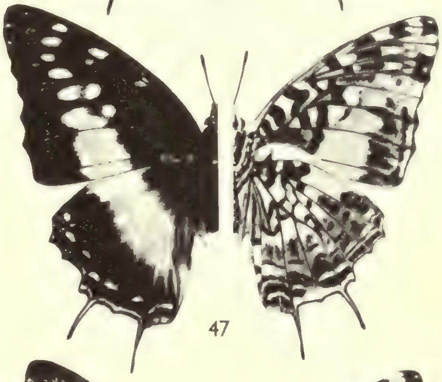
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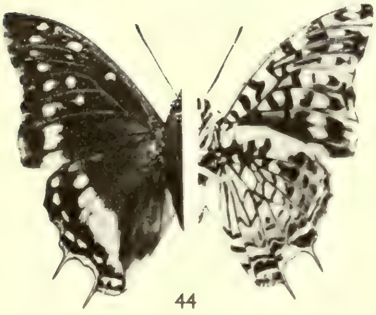
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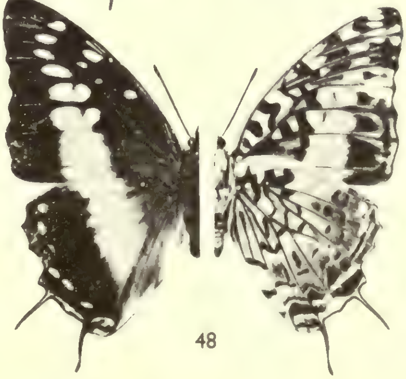
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PLATE 7

Charaxes penricei Rothschild and subspecies

FIG. 49. *penricei* Rothschild, ♂ (Zambia : Mumbwa, Wedekind), a typical ♂ with large fore wing white spots, those in 1a–1b slightly shaded bluish proximally ; fore wing marginal spots large ; hind wing bar almost straight on outer edge, blue tinged on borders, upper and underside.

FIGS. 50 and 51. *penricei* Rothschild, ♂ (Tanzania : Songea Dist.), typical specimen and specimen with blue suffusion and reduction of hind wing band, upper and undersides.

FIG. 52. *dealbata* Joicey & Talbot, ♂ (N.W. Angola : Pungo Adongo), fore wing upper spots large and white, those in 1a–1b blue, hind wing bar white at costa, rest solidly blue, upper and underside.

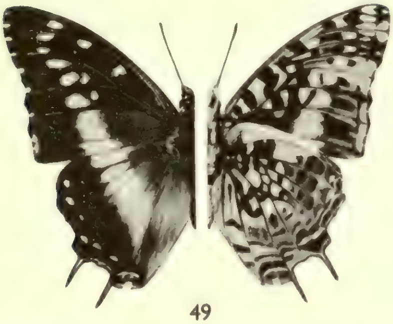
FIG. 53. *penricei* Rothschild, ♀ (Zambia : Mumbwa, Wedekind), fore and hind wing bars white, the latter with slight blue scaling on borders, upper and underside.

FIG. 54. *penricei* Rothschild, ♀ (Tanzania : Songea Dist.), with creamy fore wing bar, upper and underside.

FIG. 55. *penricei* ab. *flavus* Lathy, ♀ (Malawi : Chintechi), both wings with yellow-ochre bars, (Photo Paris Museum).

FIG. 56, ♂ (Zambia : Lundi), fore wing spots large and white, those in 1a–1b blue, white in centre ; hind wing costal spot large and white, discal bar bluish-white, elongate in 2, upper and underside.

(Figs. 52 and 56 represent a blue variation of *penricei*, undersides with strongly contrasting white patterns).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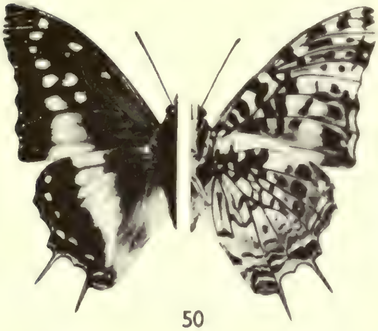
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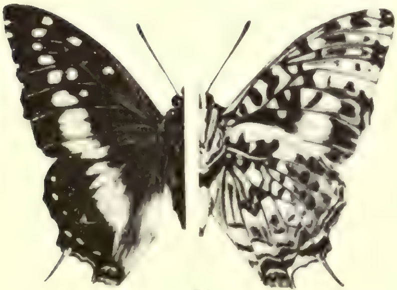
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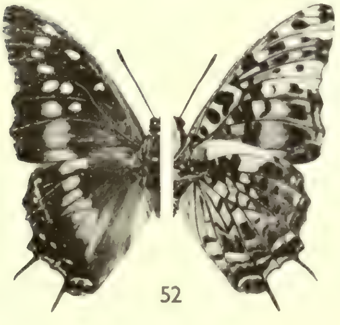
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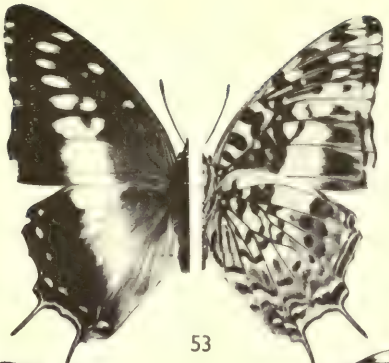
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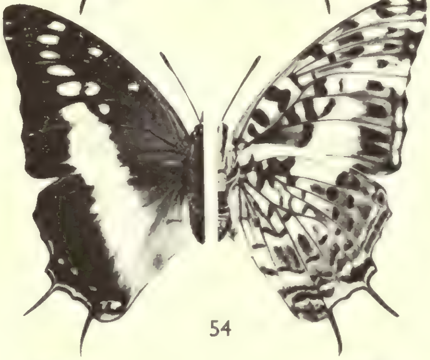
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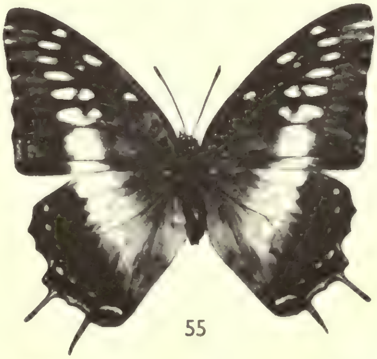
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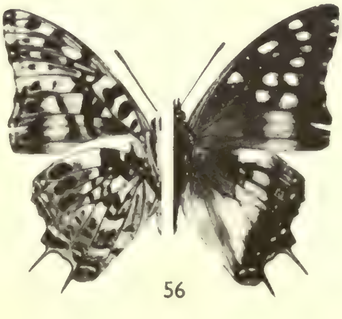
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PLATE 8

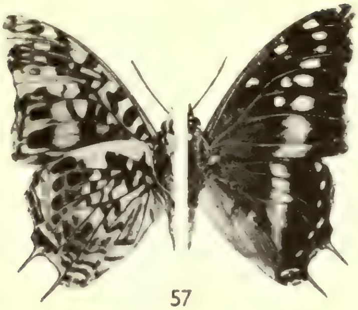
Charaxes penricei Rothschild subspecies, *Ch. paradoxa* Lathy and *Ch. cacuthis* Hewitson

FIG. 57. *penricei dealbata* Joicey & Talbot, Type ♂ (Portuguese Congo : Kibokolo, do Zombo), upper and underside, compare with specimen from Pungo Adongo, Plate 7, Fig. 52. Photos B.M. (N.H.) Nos. 36078 and 36079.

FIGS. 58–60. *penricei tanganyikae* ssp. n., Fig. 58 ♂ (Kigoma, E. side L. Tanganyika, in forest), fore wing spots large ; hind wing bar placed more toward discal line, Jap. Exped. 12/61. Fig. 59 ♂ (Kungwe, E. side L. Tanganyika), very similar to preceding specimen, hind wing costal white spot larger, Jackson, 2/54. Fig. 60 ♀ (Tanzania : Geita Dist., Geita, S.W. of L. Victoria), fore wing discal bar white ; hind wing bar with slight bluish on borders, Jackson, 10/37, upper and undersides.

FIGS. 61 and 62. *paradoxa* Lathy, ♂ and ♀ (Comoro I.), upper and undersides. Photos B.M. (N.H.) Nos. 36149 and 36150 ; 36153 and 36154.

FIGS. 63 and 64. *cacuthis* Hewitson, ♂ and ♀ (Madagascar), upper and undersides.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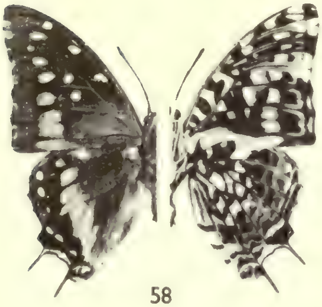
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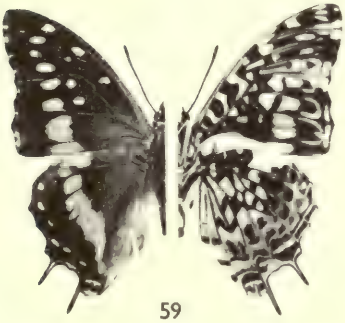
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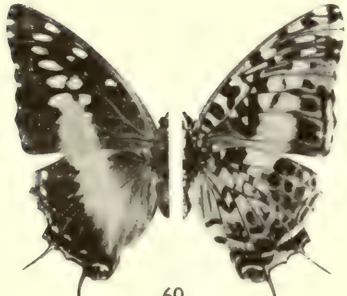
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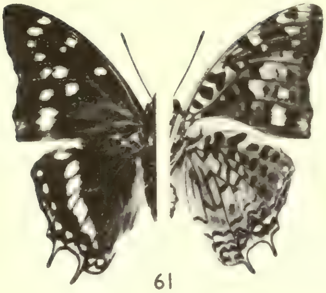
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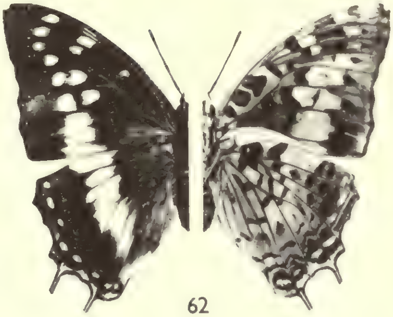
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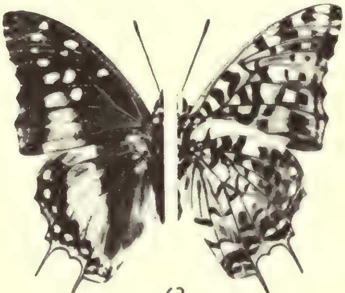
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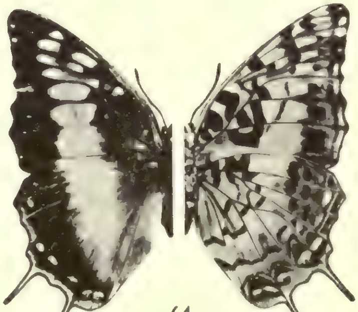
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PLATE 9

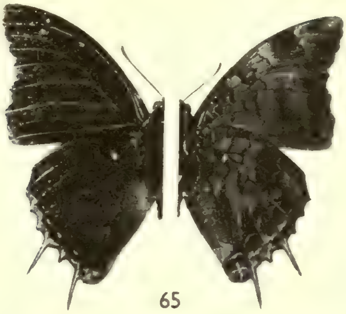
Charaxes usumbarae van Someren & Jackson and *Ch. pembanus* Jordan

FIGS. 65 and 66. *usambarae* van Someren & Jackson, topotypical ♂♂ (Usambara Range, Amani), upper and undersides.

FIGS. 67 and 68. *pembanus* Jordan, Type ♂ (Pemba I.) upper and underside. Photos B.M. (N.H.) Nos. 34028 and 34029.

FIGS. 69 and 70. *usambarae* van Someren & Jackson, Allotype ♀ and Paratype ♀, upper and undersides. Photos B.M. (N.H.) Nos. 35019 and 35020 ; 35015 and 35016.

FIGS. 71 and 72. *pembanus* Jordan, topotypical ♂ and Neallotype ♀ (Pemba I., Rydon) upper and undersides.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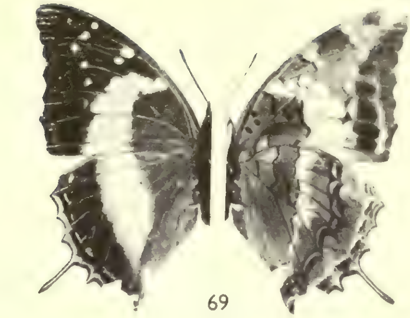
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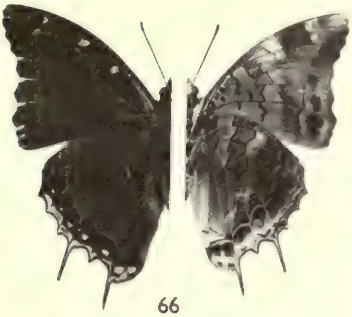
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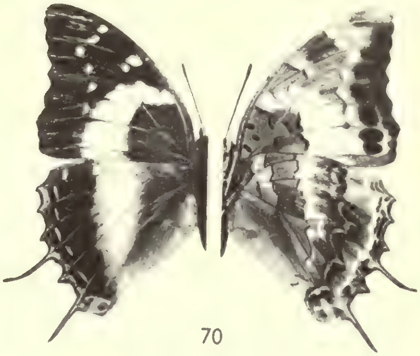
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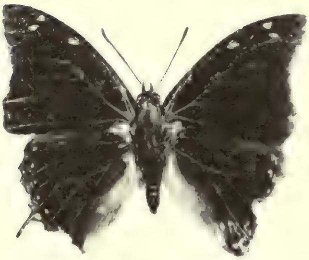
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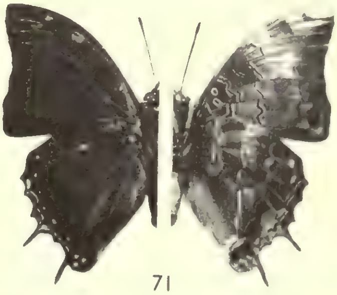
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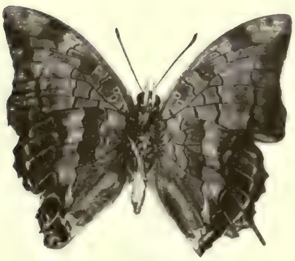
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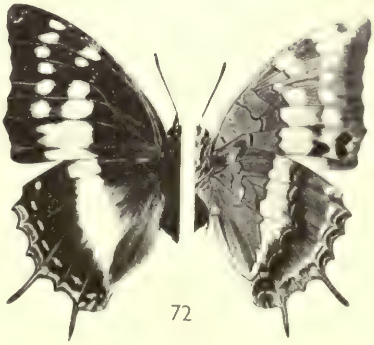
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PLATE 10

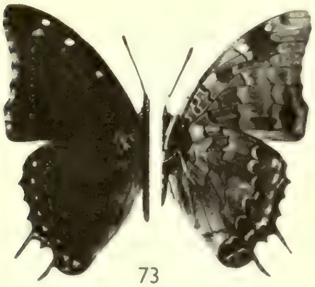
Charaxes aubyni Poulton and subspecies

FIGS. 73–75. *aubyni* Poulton, typical ♂, ♀ and ♀ f. *ochrefasciata* respectively (Kenya: Teita Hills), upper and undersides.

FIG. 76. *australis* van Someren & Jackson, typical ♂ (Malawi: Mlosa stream, Mlange, Handman) upper and underside.

FIGS. 77–79. *ecketti* van Someren & Jackson, typical ♂ and ♀ (Kenya: Karen-Ngong) and ♀ f. *ochretincta*, underside colour tinged brownish, respectively, upper and undersides.

FIG. 80. *australis* van Someren & Jackson, Neallotype ♀ (Malawi: Mlange, Blantyre, Limbe, Handman & Martin), upper and underside.



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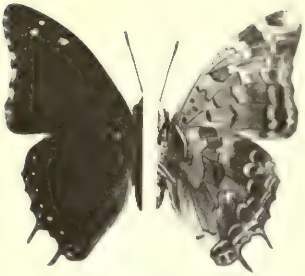

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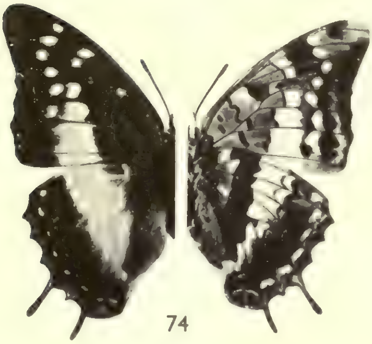

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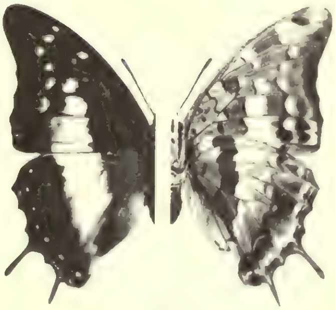

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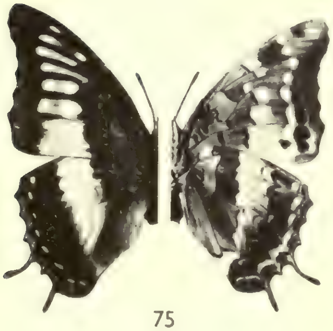

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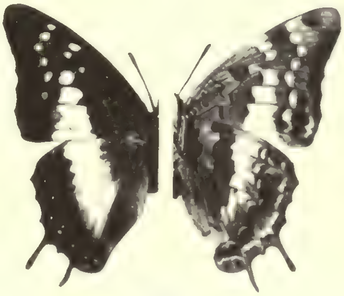

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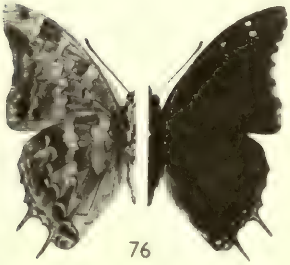

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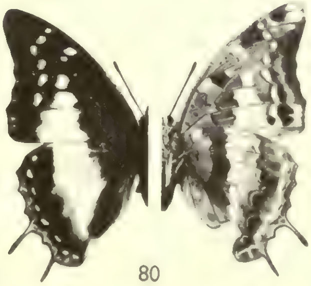

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PLATE 11

Charaxes berkeleyi, van Someren & Jackson, *Ch. karkloofi* van Someren & Jackson and *Ch. marieps* van Someren & Jackson

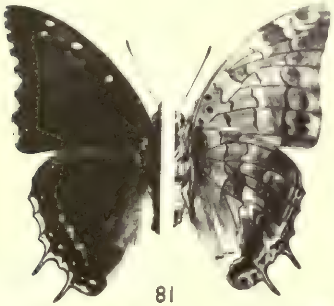
FIGS. 81–83. *berkeleyi* van Someren & Jackson, ♂ and 2 ♀♀, typical, (Kenya: Karen-Ngong), note strong marginal lunules in fore wing and borders in hind wing of ♂; uppermost ♀ underside strongly patterned, lower ♀ (bred from same family) with underside suffused brownish, upper and undersides[5].

FIGS. 84 and 85. *karkloof karkloof* van Someren & Jackson, topotypical ♂ and ♀ (Natal: The high mist forests of Karkloof and Howick), upper and undersides. Pennington Coll.

FIGS. 86 and 87. *karkloof capensis* ssp. n. Holotype ♂ and Allotype ♀ (East Cape Province: van Stadens Dist.), upper and undersides.

FIGS. 88 and 89. *marieps* van Someren & Jackson, ♂ and ♀ Paratypes, topotypical (East Transvaal: Mariepskop) upper and undersides. Kenway Coll. Durban Museum.

[5] See footnote on p. 74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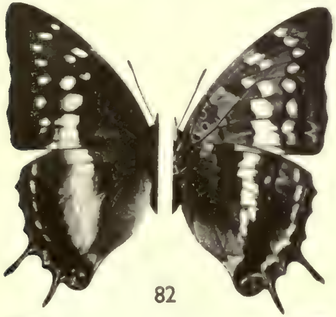
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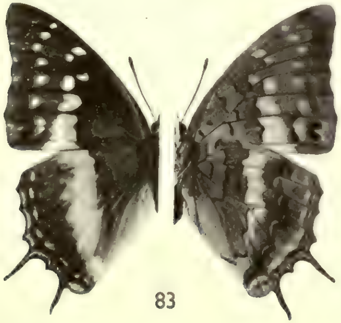
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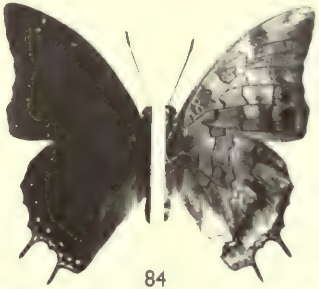
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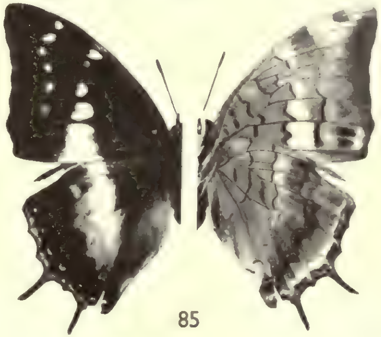
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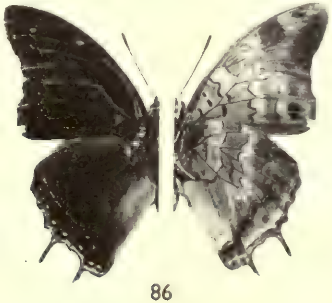
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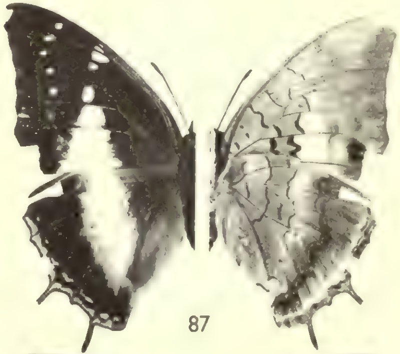
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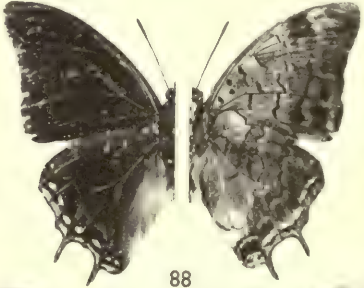
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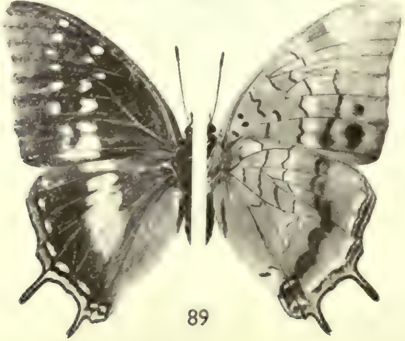
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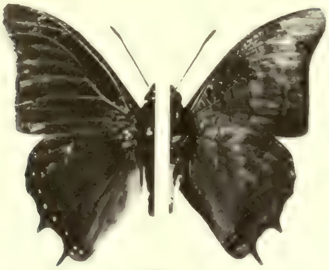
PLATE 12

Charaxes alpinus van Someren & Jackson and subspecies

FIGS. 90, 91. *alpinus* van Someren & Jackson, ♂ and topotypical ♀ (High forests on Vumba Range), ♂ typical, fore wing rather pointed, slightly acuminate, falcate ; hind wing tails very short and stout ; ♀ fore wing discal bar comparatively restricted and narrow ; post-discal spots free to 1b, spots white ; hind wing band broad at costa, tapering toward anal angle, tails robust ; colour white with slight greyish-blue on borders, upper and undersides.

FIGS. 92–97. *nyikensis* ssp. n., Holotype ♂ and Allotype ♀ (Nyika Plateau, Cottrell leg.) and ♂ and ♀ Paratypes respectively, upper and undersides.



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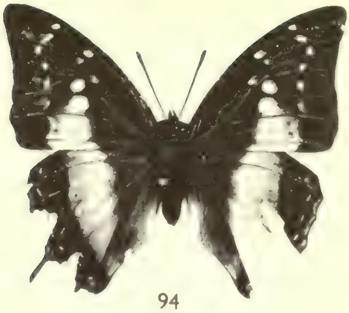

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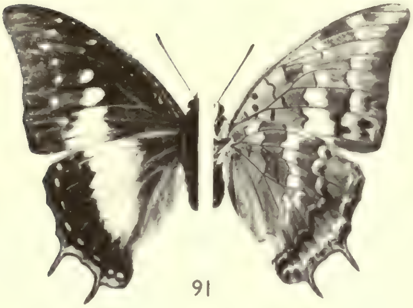

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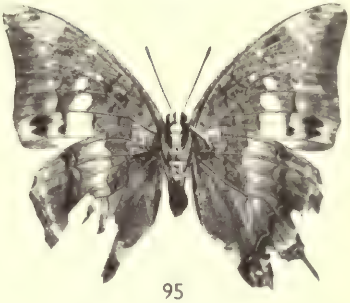

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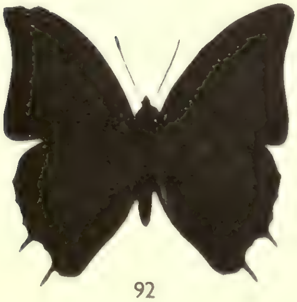

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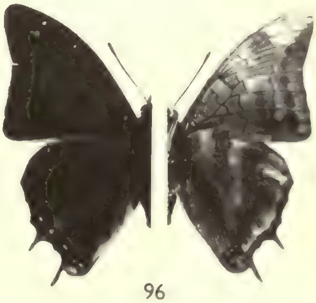

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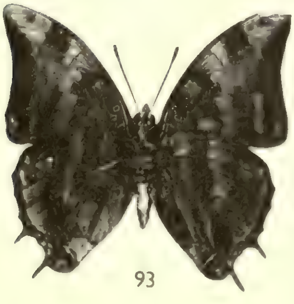

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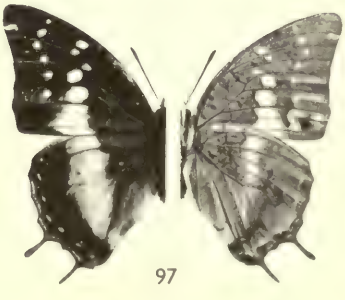

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PLATE 13

Charaxes manica Trimen and forms

FIG. 98. ♂ (Malawi: Nkata Bay), fore wing with well marked blue spots subcostal; hind wing with indication of post-discal greeny line; submarginal spots very small, punctiform, upper and underside.

FIG. 99. ♀ f. *manica*, (Malawi: Limbe), basal areas pale greeny blue; fore wing post-discal spots strongly marked, upper and underside.

FIG. 100. ♀ f. *manica*, (P.E.A.: Amatongas, nr. Beira), basal areas blue, but upper part of fore wing with dusky scaling; post-discal spots clear; hind wing submarginal spots clear, upper and underside.

FIG. 101. ♀ f. *manica*, (Zambia: Mumbwa), basal areas strongly blue; post-discal spots on fore wing reduced to one subapical; hind wing submarginal line obscured, upper and underside.

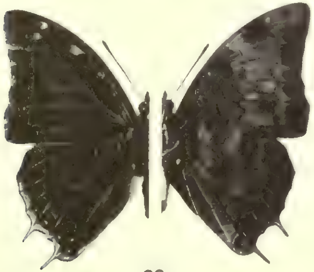
FIG. 102. ♀ f. *manica*, (Zambia: Mumbwa), basal areas dark blue, not extending to costa of hind wing; hind wing submarginal spots obscured, upper and underside.

FIG. 103. ♀ f. *manica*, (Zambia: Mumbwa), basal areas pale greeny-blue; fore wing white bar very broad on hind border; submarginal line of hind wing clear, upper and underside.

FIG. 104. ♀ f. *manica*, (P.E.A.: Dondo-Amatongas), basal areas blue with some white dusting distad, upper and underside.

FIG. 105. ♀ f. *manica*, (Malawi: Nkata Bay), upper part of fore wing basal area black scaled; post-discal spots obscured except two subapical; hind wing patch mauvy-blue, upper and underside.

FIG. 106. ♀ f. *pseudophaeus*, (Malawi: Nkata Bay), basal areas mauvy-blue; fore wing blue extended distad in 1a–1b, post-discal spots clear to 2; hind wing marginal black border narrow but submarginal linear marks distinct and conjoined, upper and underside. See also Plate 14, Fig. 115.



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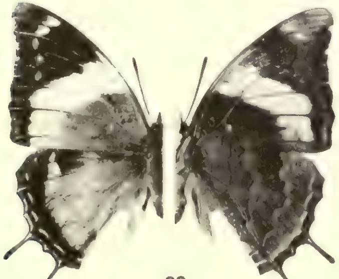

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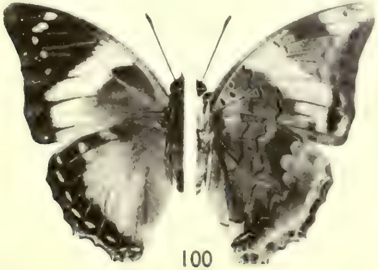

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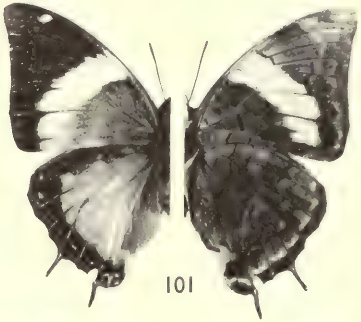

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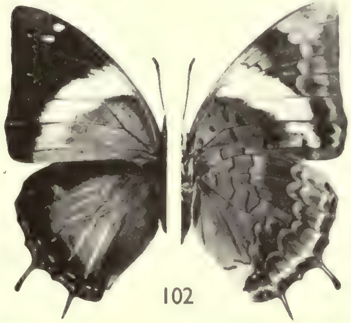

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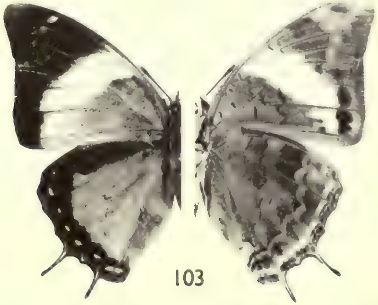

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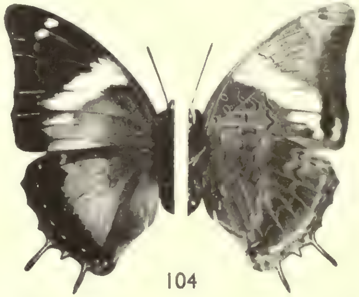

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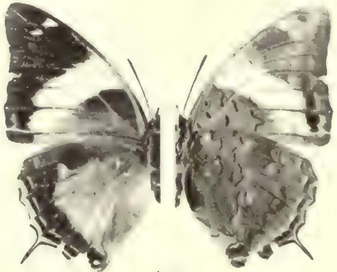

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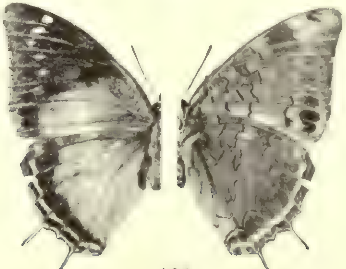

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PLATE 14

Charaxes manica Trimen forms

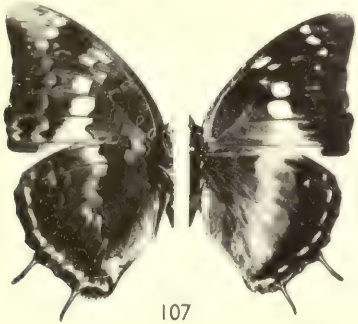
FIGS. 107, 108. ♀ f. *chintechi* van Someren & Jackson, Holotype and Paratype, upper and undersides. Photos B.M. (N.H.) Nos. 34007 and 34008 ; 34011 and 34012.

FIGS. 109, 110. ♀ f. *chintechi* van Someren & Jackson, (P.E.A. : Dondo) and (P.E.A. : Amatongas), basal areas of wings suffused with greenish-blue scaling ; distal part of fore wing cell blackish ; discal and post-discal spots orange, the former shading to bluish-white on hind margin ; hind wing patch bluish-green with white discal bar showing through, these specimens represent a primitive stage toward forms *manica* and *pseudophaeus*, upper and undersides. Coll. Pennington.

FIGS. 111–113. ♀ f. *protomanica* f. n., Holotype (Malawi : Chintechi. B.M. (N.H.)), Paratype (P.E.A. : Amatongas. Coll. Pennington) and (Nyasaland : Chintechi) respectively, fore wing spots orange, discal bar white ; base of wing greeny-blue ; hind wing basal area greeny-blue ; discal patch greeny-blue with white discal bar showing through, upper and undersides.

FIG. 114. ♀ f. *protomanica* f. n., (Malawi : Chintechi. B.M. (N.H.)), shows merging of spots beyond cell with curved white bar ; hind wing patch strongly blue-green ; fore wing post-discal spots orange ; a more advanced stage in the development of the *manica* pattern but retaining the primitive spots in the fore wing, upper and underside.

FIG. 115. ♀ f. *pseudophaeus*, (P.E.A. : Dondo-Amatongas), basal areas greeny-blue, upper and underside.



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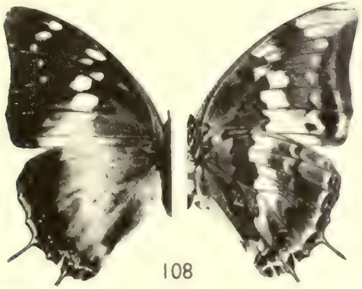

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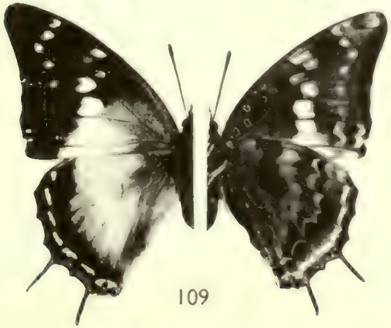

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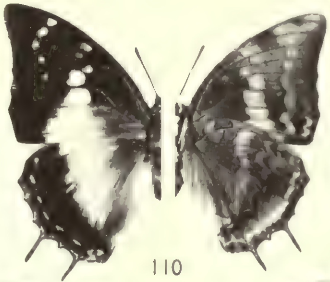

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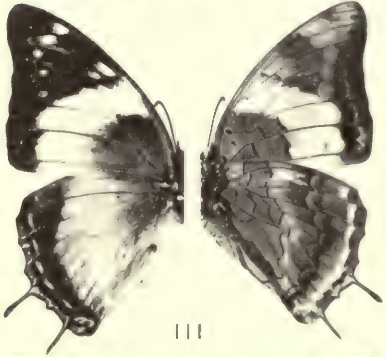

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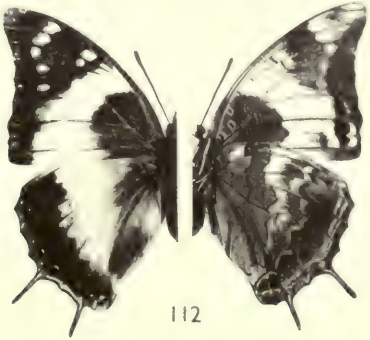

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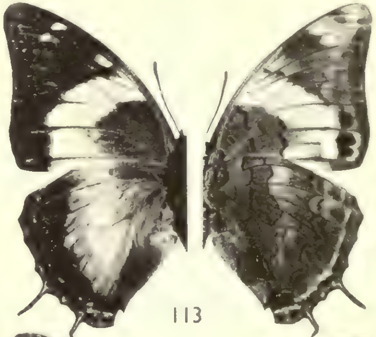

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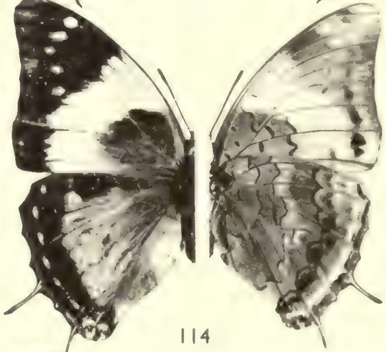

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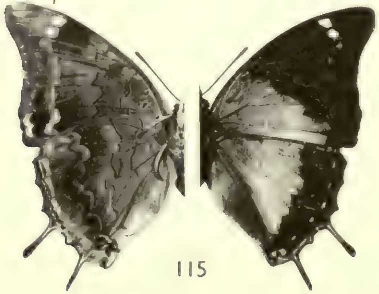

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PLATE 15

Charaxes gallagheri van Son and *Ch. fulgurata* Aurivillius

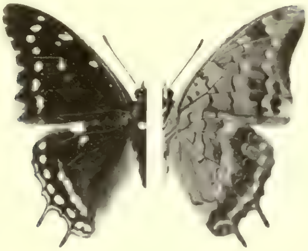
FIGS. 116–118. *gallagheri* van Son, Type ♂, ♂ var. and Neallotype ♀ (Rhodesia : Mapembe, nr. Odzi R., H. Cookson), upper and undersides. Photos D. Cookson.

FIGS. 119 and 120. *fulgurata* Aurivillius, ♂ and ♀, the original figures published by Dewitz as '*ephydra* var.' on which Aurivillius founded *Charaxes fulgurata*, upper and undersides.

FIG. 121. *fulgurata* ♀ f. *fulgurata* Aurivillius (*lunigera* Rothschild), ♀ (Zambia : Chisamba), basal half of fore wing and disc of hind wing greenish-blue, the blue extending well over the hind part of the fore wing white bar ; margin of wing strongly glaucous ; submarginal line of hind wing strong, upper and underside.

FIG. 122, *fulgurata* ♀ f. *fulgurata* Aurivillius, ♀ (Zambia : Chisamba), basal area of fore wing and disc of hind wing greeny-blue ; white bar of fore wing well developed ; distal half of wing very black, but margin glaucous ; hind wing submarginal line obscured, upper and underside.

FIG. 123. *fulgurata* ♀ f. *fulgurata* Aurivillius, ♀ (Zambia : Chisamba), basal areas darker greeny-blue with some dark scaling in cell of fore wing ; margin glaucous ; lower post-discal spots obscured, submarginal spots hardly visible but border strong, upper and underside.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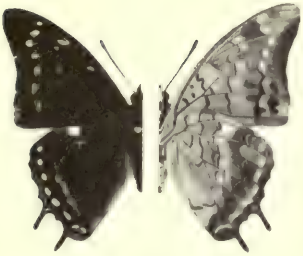
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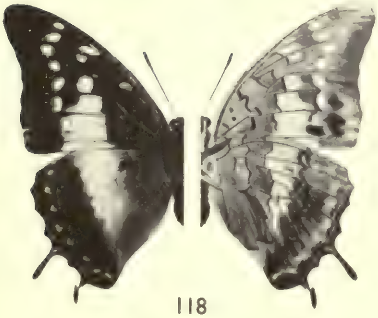
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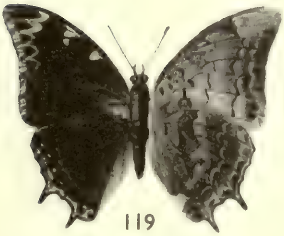
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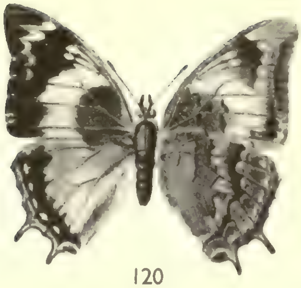
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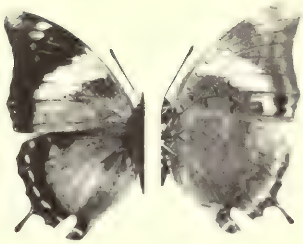
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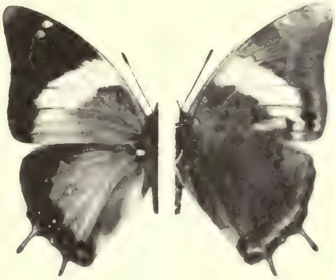
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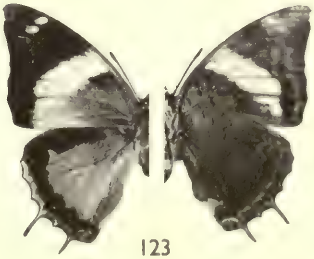

123

PLATE 16

Charaxes fulgurata Aurivillius and forms, and *Ch. martini* sp.n.

FIGS. 124, 125. *fulgurata* Aurivillius, ♂, and ♀ f. *mima* Riley (Zambia : Solwezi Dist., bred Dollman), upper and undersides. Photos B.M. (N.H.) Nos. 34030 and 34031 ; 34013 and 34014.

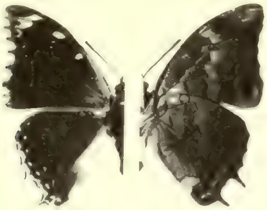
FIG. 126. *fulgurata* f.f. *mima* Riley, ♀ (Zambia : Chisamba, Cottrell Coll.), basal area of fore wing and disc of hind wing darker greeny-blue ; subapical blue spots of fore wing strong but lunules faint ; submarginal spots of hind wing distinct, upper and underside.

FIG. 127. *fulgurata* f.f. *mima* Riley, ♀ (Zambia : Chisamba), basal area of fore wing and disc of hind wing bright greeny-blue ; margin of fore wing very glaucous ; subapical marks and lunules well marked ; some extension of greenish scaling distad in 1a–1b ; hind wing marginal line strong, upper and underside.

FIG. 128. *fulgurata* Aurivillius, ♂ (Zambia : Kabompe/Bulwale, Cottrell Coll.), with upperside markings well developed, especially the post-discal green line in hind wing, but with weakly developed pattern on underside, upper and underside

FIG. 129. *viola* ♀ f. (Zambia : Mankoya, Cottrell Coll.), base of fore wing and disc of hind wing greeny-blue ; discal and post-discal spots in upper half of fore wing orange tawny ; submarginal spots in hind wing strong ; border well developed ; c.f. f.f. *chintechi* of *Ch. manica*, upper and underside.

FIGS. 130 and 131. *martini* sp. n., Holotype ♂ (Malawi : Mlange, Mlosa stream), upper and underside.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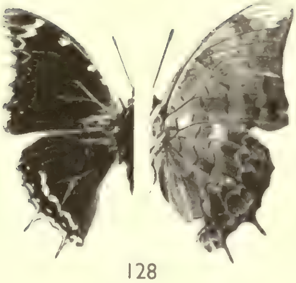
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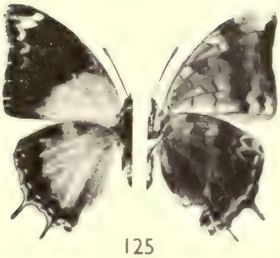
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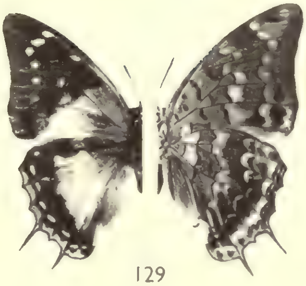
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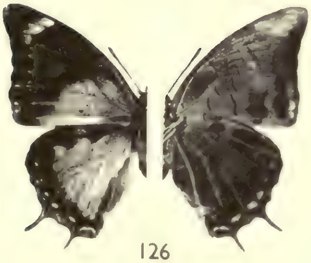
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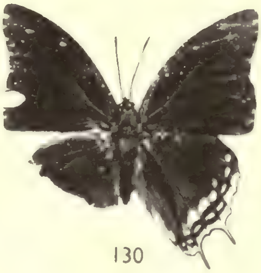
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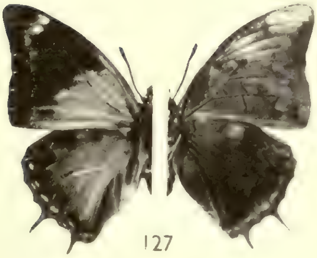
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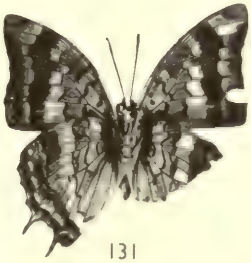
131

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C. F. COWAN

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BY

C. F. COWAN

Little Gaddesden House, Berkhamsted, Herts., England

Pp. 103–140 ; 3 *Plates*

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INDO-ORIENTAL HORAGINI (LEPIDOPTERA : LYCAENIDAE)

By C. F. COWAN

SYNOPSIS

The isolated but closely allied genera *Horaga* Moore and *Rathinda* Moore fly in the triangle India–South China–Papua. They have a characteristic appearance and highly aberrant genitalia. They contain only eight species with about forty subspecies, to which four new ones are now added. All published names are discussed and a number of species and subspecies are illustrated for the first time, as are the ♂ genitalia of all species, complete and to the same scale.

Full references are given for all taxa, and a catalogue is included of the specimens in the British Museum (Natural History).

CONTENTS

	Page
Introduction	105
Status of the Tribe	106
Early Stages	107
Scope of the Survey	108
Extraneous Taxa	108
Acknowledgements	108
Rathinda Moore	109
R. amor (Fabricius)	109
Horaga Moore : Name ; Pattern ; ♂ Genitalia ; Sexual Insignia ; Range ; Keys to the Species	110
H. onyx (Moore)	115
H. syrinx (Felder)	125
H. albimacula (Wood-Mason & de Nicéville)	127
H. amethysta H. H. Druce	132
H. selina Grose Smith	134
H. lefebvrei (C. & R. Felder)	135
H. rarasana Sonan	136
Synonymic List	136
References	138
Index	140

INTRODUCTION

There are three small Indo-Oriental generic groups or tribes in the Theclinae subfamily of Lycaenidae which I refer to as the Horagini, the Cheritrini, and the Marmessini (**tribb. n.**). In the course of a current study of the last, problems involving species of the other two have repeatedly arisen, and the present survey has been compiled. Separate articles are planned for the Cheritrini and the Marmessini, but some repetition will be avoided by covering all three in the general remarks below on their status, and the full list of references appended should require only minor additions later.

There are 61 names involved in the nomenclature of the 2 genera *Horaga* and *Rathinda*. They have never yet been comprehensively surveyed though Seitz (1926) discussed 40 (figuring 12) out of the 52 then current. One of those omitted by Seitz was *syrinx* (Felder, 1860), the second senior taxon.

Seitz' work was based on that of Fruhstorfer, who had published two important preparatory articles in 1912 and 1914. These articles demonstrate one great difficulty in the genus *Horaga* ; that of distinguishing between the various races of *onyx*, which now appears as a mainly northern species, and those of the much more southerly *syrinx* (at that time known as *moulmeina*). In 1912, as will be seen in the synonymy under each name, Fruhstorfer listed 15 subspecies for *onyx*, including *moulmeina*. Two years later he had moved to the other extreme, allotting *moulmeina* 13 and leaving *onyx* with only 3. Seitz listed them all together, and so most of them remained till 1941.

Corbet (1941) dealt with 30 names, including 3 not mentioned by Seitz, in his appraisal of *Horaga* from the Malayan viewpoint. He recognized the importance of *syrinx* and, distinguishing between it and *onyx*, arranged their respective subspecies almost as they are below.

STATUS OF THE TRIBE

Each of the three tribes Horagini, Cheritrini and Marmessini forms a compact entity quite distinct anatomically from all other Lycaenidae. Each is smooth-eyed, has smoothly scaled palpi, antennae with gradual cylindric club, and a lobed hind wing with three tails of which the central one, that at vein 2, is the longest. These characters are also shared by the small genera *Eooxylides* de Nicéville and *Neomyrina* Distant which, however, are both of unmistakable appearance and have more normal Lycaenid genitalia, while the fore wing vein 5 of *Neomyrina* consistently originates much closer to vein 6 than to vein 4 instead of mid-way between them.

The Horagini differ in appearance from the other two tribes, as also from *Eooxylides* and *Neomyrina*, in wing pattern and in having the hind wing tails all filamentous, the termen not being extended along any ; whereas the others have the tail at the end of vein 2, at least, broad-based, both the wing margin and the vein being produced along the vein for some distance.

The ♂ genitalia of each tribe are highly aberrant and quite characteristic. They are the most positive feature for identifying the allegiance of a doubtful ♂. They are small, compact and robust in the Cheritrini, whose stout aedeagus is charged with at least one cornutus and each of whose valvae carries dorsally a long rearward-curved horn. They are large, flat, simple, and loosely assembled in the Marmessini. In both these tribes the normal brachia or falces of the tegumen are entirely obsolete.

The Horagini, by contrast, has a heavy, elongate and most elaborate ♂ genitalia without cornuti or horned valvae, but incorporating long and specialized brachia (Pls. 2 and 3) which are unique among Lycaenidae. They are not the usual simple paired hooks curved rearwards, but in *Rathinda* are very long with a central spicule, and curve forwards to the bases of the valvae where they curl round for the tips to point rearwards. In *Horaga* they are folded ventrally above the valvae and are asymmetric ; one, always the left, is simple and more or less falciform, while the right is modified in each species, spectacularly so in three.

The wing structure has been discussed by Moore (1881), de Nicéville (1890), and others in detail and will not be mentioned further except to emphasize that no feature can be found in it reliably to separate the two genera. *Rathinda* can readily be distinguished from *Horaga* by wing pattern and by ♂ genitalia, but not by shape or venation ; early definitions on the last basis for Indian forms resulted in the quite plausible description of a new *Rathinda* in the Philippines which in fact was an already known indigenous *Horaga*.

Wing venation is a valuable aid to the separation of genera, but there comes a point when individual or specific variation in some detail exceeds generic, and it becomes necessary to define recognizable genera on other grounds to avoid sinking them. The latter step should not be taken till far more is known about early stages, anatomy, courtship procedure and the significance of sexual insignia (" secondary sexual characters ") (cf. Varley, 1962). Such a situation was met in the Pierid genus *Saletara* Distant which (vide Cowan, 1955) had to be upheld distinct from *Appias* by the unusual ventral tuft of the ♀ when venation differences proved unreliable, and the recent merger of four good Lycaenid genera into *Jacoona* Distant on the grounds that no external feature could be found to distinguish their ♀♀ is regrettable ; the ♂♂ are so divergent, and habits and habitats so varied.

So whereas *Rathinda* could, on wing venation and shape and most other superficial characters, well be submerged in *Horaga*, which has page priority, I preserve it.

EARLY STAGES

The larva and pupa of *Rathinda amor* were described and well figured by Moore (1881 : 71, pl. 34, figs. 1b) mistakenly under the name *Spalgis epius* (whose correct early stages were illustrated by Aitken, 1894). Another illustrated account was given by Davidson, Bell & Aitken (1896 : 389, pl. 5, figs. 7, 7a). Sevastopulo (1935, and 1947 : 577) added further food-plants.

Horaga onyx was similarly treated by Mackinnon & de Nicéville (1898 : 387, pl. 5, figs. 18a, 18b), and on the following page *H. albimacula* (*viola*).

In all these accounts only the mature larva and the pupa are dealt with. Bell (1919 : 754) gave a most valuable description of the full life history of *Rathinda amor*, giving its habits and listing food-plants, after which he summarized all known about *H. onyx* and *H. albimacula*.

The known larvae of the tribe are very similar in form as might be expected, and unlike other Lycaenidae with from eleven (*Horaga*) to fifteen (*Rathinda*) triangular fleshy dorsal and lateral horns. The resulting prickly appearance of the larva inspired the colloquial name " Monkey Puzzle " for *Rathinda*, after the spinose Chilean conifer *Araucaria*. This species feeds on the flower and leaf buds of a large range of shrubs including Rubiaceae, Myrtaceae, Dipterocarpeae, Euphorbiaceae, Loranthaceae and Sapindaceae, while the only food-plant recorded for *Horaga* is *Coriaria nepalensis*.

The pupae, which stand erect from the upper surface of a leaf or from a twig, are stout and strongly incurved ventrally. They are firmly fixed at the tail but otherwise free, and are capable of making a clicking noise.

There is no record of association with ants, whose presence is not necessary for survival.

SCOPE OF THE SURVEY

All the published names in the tribe are discussed below, giving references and the representation of each in the collections of the British Museum (Natural History), which is abbreviated hereafter to B.M. (N.H.).

The Synonymic List of the complete tribe is in the same sequence as the main discussion, gives the range of each subspecies, and acts as a summary.

Photographic illustrations are given on the Plates of at least one ♂ specimen of each species, and of the complete ♂ genitalia to scale of all species.

EXTRANEOUS TAXA

The following seven names have from time to time been included incorrectly in *Horaga* and will not be mentioned further :

achaja Fruhstorfer, 1912 : 233. Anatomically in the Marmessini ; to be dealt with in due course.

akara Ribbe, 1926 : 83. Assumed a misspelling for *anara* Fruhstorfer. See entry below under *celebica* Ribbe.

andamana Moore, 1877 : 589. A subspecies of *Hypolycaena erylus* (Godart), not a synonym of *Horaga rana* de Nicéville.

araotina Evans, 1933 : 413. A name which will be dealt with in Marmessini.

celebica Ribbe, 1926 : 83. " *Horaga?* . . . ähnlich *H. akara* . . .". From further lengthy description undoubtedly not a *Horaga*, probably either *Hypolycaena* or *Chliaria*.

himeros Fruhstorfer. Nomen nudum? Probably a label name only, for *Rathinda amor* in Ceylon. ♂ and ♀ " types " in B.M. (N.H.).

inari Wileman, 1908 : 325. Described as a *Tajuria* species. Applies to the Formosan subspecies of *Chliaria kina* Hewitson, see Corbet (1940 : 90).

ACKNOWLEDGEMENTS

I am grateful to the Trustees of the British Museum (Natural History) for permission to examine the National Collections and Libraries, and to the Keeper of Entomology and his staff, particularly those at Tring where the Lycaenidae are at present housed, for their ever-ready help. I am especially indebted to Mr. N. H. Bennett of the Staff for his patient assistance in the dissection of specimens and advice from his long experience of Lycaenidae, and to Mr. G. E. Tite for his continual encouragement.

I would like also to thank Colonel J. N. Eliot, Mr. G. C. Stubbs, and the Hope Department of Entomology, University Museum, Oxford for the generous loan of specimens from their collections, and finally Mr. J. V. Pearman, without whose extra-low-power eyepiece the very large genitalia would not so easily have been photographed.

RATHINDA Moore, 1881

Rathinda Moore, 1881 : 99. " Type *R. amor* " (ibid.).
Cupido Hübner, 1819 : 77 [praeocc.]. Type *Papilio amor* Fabricius, fixed by Hemming, 1960 : 10.

The gender of the genus must be fixed. The derivation is obscure. It may reflect the sombre colour by coupling the words Hindi and *rat* (Urdu ; gender feminine) meaning night. Less probable is a connection with *ratha*, the Brahman processional car with red decoration, or with *rathin*, the ancient Brahman priesthood. But it may well be fanciful ; Moore had earlier in the same publication (p. 56) introduced the name *Rahinda* for a new Nymphalid genus. All things considered, it should be regarded as feminine.

Moore diagnosed the genus on the page following his *Horaga*, but defined no actual difference. The fore wing costal veins are more widely separated, and the hind wing termen more dentate, than is the case with *Horaga* species in India, but not with some from further east.

The hind wing pattern is distinctive and unusual in having a more or less complete submarginal band of reddish spots on the plain dark brown upperside, and a complex pattern of black strigae and whitish stipple on the buff underside. The white band which bisects the brown fore wing on both surfaces is arcuate from mid-costa to the outer end of the dorsum, not straight to mid-dorsum as in *Horaga* underside.

The ♂ genitalia are as aberrant as those of *Horaga*, and of similar stamp, but the long reflexed brachia with their central spine are quite distinct.

The differences between the two genera may be summarized as follows :

RATHINDA

Hind wing upperside with red markings ; no blue on the upperside ; underside base of fore wing and most of hind intricately patterned with black and whitish on buff ; white band on underside of fore wing arcuate from mid-costa to near tornus.

♂ brachia symmetric, each with a median spine, and excessively long ; 1½ times length of vinculum and the excess length curled round in the anterior, ventral, end of the vinculum.

No ♂ insignia.

Small ; confined to Ceylon and India south of the Himalaya.

HORAGA

Upperside often with blue or violet, but never red ; underside ground colour more or less uniform and markings simple ; fore wing underside white band inner edge straight, from mid-costa to mid-dorsum (or otherwise in the Philippine *lefebvrei* and the Formosan *rarasana*).

♂ brachia asymmetric, and not longer than the vinculum.

With or without ♂ insignia.

Mostly larger ; all seven species occur east of India, three reach there, of which two are found in Ceylon.

Rathinda amor (Fabricius)

(Pl. 1, fig. 10 ; Pl. 2, figs. 17a, b)

Papilio amor Fabricius, 1775 : 518, No. 321. India Orientali.
Papilio triopas Cramer, 1780 : 64, pl. 320, figs. G, H. Coromandel.
(The misspelling *triopus* has frequently appeared.)

Also figured by Seitz, pl. 146B, fig. f1 (♀); by Woodhouse (1952 : pl. 20, figs. 11, 12); and many others.

A species somewhat variable in size, markings and underside colour according to season, but with no constant geographic differences.

Fore wing length ♂ 10–14 mm., ♀ 12–16 mm.

It has been said not to occur above 2,500 feet, but Woodhouse (1952 : 138) gives it up to 3,000 feet in Ceylon and I have found it at that elevation in South India round Bangalore and Nandi Drug.

B.M. (N.H.), 106 ♂, 146 ♀, Ceylon, Peninsular India, East Pakistan, and Assam.

HORAGA Moore, 1881

Horaga Moore, 1881 : 98. " Type *H. onyx*." (ibid.).

Gender of the Genus

I deduce that the name is an allusion to the characteristic underside white stripe which, with its dark edging, gives a *trompe l'oeil* slit-like or gashed effect. The Greek feminine noun ῥαγας means a chink or rent, and the genus is of feminine gender.

Hewitson (1863 : 35), dealing with the Philippine species *lefebvrei*, at that time in the genus *Myrina*, remarked that Boisduval had proposed a new genus for it. No such name has been traced.

Generic Pattern

The basic wing pattern of the genus is simple. The upperside is dark brown to black with an ovate white fore wing discal patch; the wing bases often being broadly blue or violet. The underside is ochreous to olive brown with a white stripe across both wings from mid-costa on the fore wing to near the hind wing tornus, where it becomes overlaid with shining metallic green scales and is sharply angled inwards to end at mid-dorsum; this stripe is narrowly dark brown along its outer (fore wing) or inner (hind wing) edge. The hind wing tornus bears two large black spots, one marking the lobe, the other at the end of space 2, which are separated by a large black-dusted pale grey space. Interior to these markings is a series of metallic green lines.

The basic pattern is slightly modified for each species, but is only departed from materially on the undersides of the two eastern species *lefebvrei* and *rarasana*.

♂ Genitalia

The Felders, when naming *lefebvrei* in 1862, remarked on the long slender abdomen of the ♂, and its striking resemblance to the equally aberrant but quite unrelated species of the Miletini. In *Horaga* the length is caused by the elongation and inclination of the vinculum, which lies almost parallel to the abdominal axis and the valvae. Only in *onyx* and *syrinx* do the genitalia even approach normal size; in the smallest species, *amethysta*, they are some 5 mm. long, comparable with half the fore wing length. The tegumen terminates in small paired subtriangular uncal plates. The aedeagus is simple and relatively small.

The left brachium or falx is in all species a more or less simple, curved, evenly tapered spike, crossing the other like half-folded-arms between the tegumen and the valvae from left to right.

The right brachium is not greatly differentiated from the left, nor does it vary much, among the more widespread western species. In the difficult *onyx-syrinx* complex, which has the more compact build, it is gradually flattened into a rounded blade, ending in an abrupt point which springs from the inner edge.

The right brachia of *albimacula* and the eastern *rarasana*, whose vinculum and tegumen are about twice as heavy, valvae longer and aedeagus relatively slimmer, are very similar.

Two species have a spur near the base of the right brachium. In the Philippine *lefebvrei* the brachium is darkly sclerotized for the basal third, where it emits a sharp spine ; it is then deflected inwards as a long, broad, square-shouldered blade ; and its terminal third is a stout curled spike, very brittle and easily broken off (it was broken in three out of six specimens examined). *H. selina* from Sulawesi (Celebes) has a prominent handle-like projection from the extreme base of the right brachium, which is then angled, and terminates in a broad square bifurcation.

The armature of the rare *amethysta* is even longer, and the right brachium crosses over to end in an abrupt saucer-shaped disc which it holds in a horizontal plane parallel to the wings when set. The function of this frying-pan affair defies conjecture. It also is brittle and frequently missing.

The valvae of all species are more or less densely covered on their inner faces with a vesture of fine hairs which may be spinose in the basal portion. They are blade-like and tapered, thick along the curved ventral edge, very thin dorsally, round-tipped, and specifically distinct.

Sexual Insignia

The ♂ insignia (" secondary sexual characters ") of the genus, when present, are modest. None are evident in *albimacula*, *amethysta*, and *selina*, and *rarasana* has only a small indistinct dark grey brand lying astride vein 1, about a third of its length from the base, on the fore wing underside.

Both *onyx* and *syrinx* have the fore wing dorsum slightly bowed outwards instead of being quite straight, and they bear a long oval ochreous brand in a larger white polished area about the centre of vein 1. Associated with this brand, on the upperside of the hind wing, is a dense patch of very fine, long, dark brown hairs rising from the basal half of space 7. These hairs, which are somewhat fugitive, are normally erect but may be flattened by the fore wing in set specimens. They have not been noted before and are obscure, being exactly concolorous with the basal half of the hind wing costa, but can be clearly seen when viewed in silhouette from the side at wing level. They are much finer than the ordinary recumbent hair-scales found on the wings of both sexes.

On the underside of the fore wing of the ♂ *lefebvrei* there is a similar but obscure white brand, and the hind wing upperside has a very dense tuft of slightly paler and much more concentrated, so less obscure, greyish brown hairs rising from the upper half of the cell. The ♂ palpi of this species are of a greasy translucent cream colour, whereas those of the ♀ are of the normal white and black.

Geographical Range

Horaga species inhabit India (south and east from Himachal Pradesh), Ceylon, and East Pakistan, southwards through Malaysia and Vietnam to Formosa and New Guinea. The largest is confined to Formosa, one species is known only from the Philippines, and one only in Sulawesi. The remaining four species range wider. None is common, though they often favour open country.

In listing subspecies a west to east sequence will be followed.

KEYS TO THE SPECIES

A Key for the separation of the *Horaga* species by superficial characters is given below, followed by one based on the ♂ genitalia. These cannot be combined, aberrant tendencies from either aspect not always coupling with those from the other.

KEY FOR THE VISUAL SEPARATION OF *HORAGA* SPECIES

(Pl. 1)

1	Underside with the normal generic pattern, the ochreous colouring similar on either side of the median band on both wings. Widely distributed	2
–	Underside with the hind wing at least abnormal. Restricted distribution . .	5
2	Larger in each locality. Hind wing underside white band distinct. Upperside in most areas with much blue or violet. ♂ fore wing dorsum slightly bowed and an ochreous brand on the underside near the centre of vein 1; hind wing upperside with an obscure subcostal area of long brown hairs. Very variable seasonally outside the tropics, and geographically	3
–	Smaller. Hind wing underside median band obsolescent, often leaving only the inner dark line. Upperside much less blue, often none. No ♂ insignia	4
3	Usually slightly smaller, duller, and with more rounded wings in each locality. The underside white band broader on both wings, more abruptly dilated just below the fore wing costa to which it, or at least the dark line at its outer edge, usually extends	***onyx***
–	Slightly larger, brighter, the ♂ fore wing apex pointed and the termen straighter. Underside brighter, the fore wing white band not reaching above vein 7 and, in Malaya, Sumatra and Borneo, distinctly narrower and even	***syrinx***
4	Upperside all or mostly dark brown, with the fore wing white patch extensive as usual and the violet areas normally very restricted. Underside with the fore wing white band dilated as usual, at least 3 mm. wide in space 3. Fore leg tibia plain, or at most one dark ring	***albimacula***
–	Upperside mostly violet, with regular dull brown borders; the fore wing discal spot reduced to seldom more than a bar at the cell-end, though the band may show through from below. Underside fore wing white band narrow, seldom over 1 mm. wide, and straight. Fore leg tibia, as in *onyx* and *syrinx*, with two dark rings between the dark joints	***amethysta***
5	Underside with the fore wing normal and the hind wing normal up to the median band, beyond which are an irregular metallic green line and two black spots in spaces 2 and 6, followed by a broad area to the termen minutely mottled ash-grey and white. No blue on the upperside. Confined to Sulawesi	***selina***

– Underside both wings abnormal 6

6 Upperside dark brown, usually with some sparse basal blue scales, and the fore wing white patch large, oblique, and shifted in to the centre of the wing. Underside chestnut brown with dark-edged white markings which differ slightly between the sexes; on the fore wing a costal streak from the base under vein 12 and a semicircular or subtriangular area based on the dorsum with apex at the cell-end; on the hind wing a subcostal streak from the base, and ovate spots at the cell-end (larger, triangular and filling the cell in the ♀), postdiscal across spaces 4 and 5 and at mid-costa (all conjoined in the ♀); two metallic green lines, one curving from the base below the cell to mid-vein 4, the other submarginal. Fore leg tibia mainly black. Male palpi translucent vaseline-yellow, and the hind wing with a prominent tuft of grey-brown hairs overlying the base of the cell. Confined to the Philippines **lefebvrei**

– Upperside black; cilia of termen prominently white, an oblique white band on the fore wing from near mid-costa towards the tornus, and a rectangular shining violet subcostal area filling most of spaces 4 to 6 on the hind wing. Underside chalk-white; both wings with ochreous narrow cell-end bars and broader postdiscal and terminal bands, the last carrying on the hind wing a complete submarginal series of metallic green lunules and a large black tornal spot in space 2. Confined to Formosa . **rarasana**

KEY TO THE DIFFERENCES IN ♂ GENITALIA *HORAGA*

(Pls. 2 and 3)

1 Conventional for the genus; right brachium or falx simple, curved; uncus lobes broadly triangular; valvae tapered, curved, and hirsute along ventral half of inner face 2

– Right brachium abnormal, compound; uncus lobes stunted; valvae less tapered, inner face more completely hirsute 5

2 Smaller, overall length excluding aedeagus under 2 mm., and not visibly affecting length of abdomen. Valvae basal half broad, distal taper more abrupt . . . 3

– Abdomen, as in all remaining species, noticeably elongate, genitalia length excluding aedeagus at least 3 mm. 4

3 Valvae basally truncate, distal third tapered to the tip and angled at about 30°; distal hairs and anterior spines clothing only the posterior half of the inner face; usually but not invariably with a distinct tooth mid-way along the ventral margin. Aedeagus stout (Pl. 2, fig. 18). . . . . **onyx**

– Valvae basally of uniform width, distal quarter tapering and evenly curved through almost 90°; distal three-quarters of inner face hairy; ventral margin simple. Aedeagus slim. (cf. Fruhstorfer, 1912 : 232, fig. 3, from Java) (Pl. 2, fig. 19) **syrinx**

4 Uncus lobes broad as in *onyx* and *syrinx*. Valvae not projecting beyond uncus; with a slight but even curve. (Pl. 2, fig. 20) . . . . . . **albimacula**

– Uncus lobes long and narrow. Valvae project well beyond end of uncus and are narrow, tapered, and distinctly sinuate (Pl. 3, fig. 21) . . . . . **rarasana**

5 Right brachium ends in a disc. Uncus lobes small and ovate (Pl. 3, fig. 22) . . **amethysta**

– Right brachium sharp-ended; equipped with a sub-basal projection. Uncus lobes stalked 6

6 Right brachium with the terminal half broadly bifurcate (Pl. 3, fig. 23) . . . **selina**

– Right brachium centrally flattened and shouldered before a single terminal curled spike (Pl. 3, fig. 24) . . . . **lefebvrei**

Notes : (i) The valvae of five species are well illustrated to scale by Corbet (1941 : 49). That of *onyx* is one without the central tooth. Also shown with them, but reversed in aspect so concealing its allegiance to the Marmessini, is that of *achaja* Fruhstorfer.

(ii) Three illustrations are given in Corbet (1956 : pl. 16). These are not to scale, otherwise that of *albimacula* would be by far the largest on the plate.

(iii) Shirôzu (1960 : 311, 313, figs. 345, 346) gives admirable illustrations of *rarasana*, *albimacula* (as *anytus*), and *onyx* to scale. That of *onyx* shows the central tooth of the valva.

HORAGA ONYX

(Pl. 1, figs. 1–5 ; Pl. 2, fig. 18)

Though it has the greatest range in longitude, from N.W. India to South China and Formosa, this species is well surpassed in southern latitudes by *syrinx*. It is the common species in the north but becomes much rarer at the equator and does not extend beyond Sambawa and Borneo. Its full range on the Asian mainland will be interesting to ascertain. It would appear to have reached Formosa via Asia rather than the Philippines where it is not known, but neither has it been recorded between Thailand and Hongkong, nor from Hainan. In its northern, non-tropical races it has well-marked seasonal forms.

The anterior tail is very short in Ceylon specimens, intermediate in Indian ones, and thereafter normal.

The white band on the fore wing underside, or at least the dark posterior line edging it, reaches the costa, whereas in *syrinx* it does not. This feature, well known and reliable in Indian races, breaks down in specimens from Malaya, Sumatra and Borneo where the band becomes extremely narrow and even in *syrinx*, " sausage-shaped " in ♀♀ and linear in some ♂♂, while in *onyx* it is also narrowed but continues to be anteriorly dilated. Then in Java, as far south of the equator as Ceylon is north of it, the broad-banded features return to both species.

A series of seven *Horaga* ex coll. Rothschild taken by Hagen on the island of Banka in 1891 contained two *onyx* and four *syrinx* ♂♂ (confirmed by dissection) and cast an interesting light on the appearance of the two species there. They conform to the respective Sumatran subspecies.

H. onyx cingalensis Moore

Horaga cingalensis Moore, 1883 : 525. Ceylon.
H. onyx cingalensis Moore ; Fruhstorfer, 1912 : 232 ; 1914 : 35.

Figured by Woodhouse (1952 : 138, pl. 20, figs. 20, 21.)

This is quite the brightest of the *onyx* subspecies. The ♂ upperside is of a deep clear blue which fills most of the fore wing cell ; the fore wing apical border is black and tapers to a point at the tornus ; the white spot is clear, quadrate, comparatively small, and usually with some blue between it and the terminal border. The hind wing is blue up to the costal border above vein 6, and out to the almost linear terminal border ; the white median band is faintly visible by transparency from below.

The ♀ upperside is duller, rather violet-blue, with a slightly larger white patch and broader, more diffuse, dark borders.

The underside is olive-brown as in *onyx* wet season form, with well-marked white bands and tornal black spots.

The size is average for the species ; fore wing length 13–16 mm.

South Indian and some North-West Indian specimens are intermediate between this and the next subspecies, having broader black borders but the same bright blue colour in the ♂.

B.M. (N.H.) ♂ Holotype, 31 ♂, 12 ♀, Ceylon ; 12 ♂, 23 ♀, S. India.

H. onyx onyx (Moore)

(Pl. 1, figs. 1, 2)

Thecla onyx Moore, 1857 : 30 as Boisduval M.S. " Moulmein ".
Horaga onyx (Moore) ; Moore, 1882 : 248. " Himalaya not Burmah."
H. onyx onyx (Moore) ; Fruhstorfer, 1912 : 232.
H. onyx onyx (Moore), f. *arta* Fruhstorfer, 1914 : 34. Assam.

Figured by Seitz in Vol. 1 (1908 : pl. 72, figs. c1, c2). In Vol. 9 (1926 : 981) he says these figures are of *cingalensis*, but they are much nearer *onyx*.

This is the type-species of the genus, and its senior taxon. Though the name had been current with various authors for at least ten years before 1857, Moore's was the first description.

Moore described his single specimen as " pale ferruginous brown " on the underside, and from " Moulmein—presented by the Trustees of the British Museum " to the East India Company Museum. The East India Company collection was returned to the B.M. (N.H.) in 1860.

In his subsequent amplification Moore said that the type specimen was a ♂, that the fore wing underside white band reached the costa, and that it was " now in the British Museum. Its locality label is Himalaya, not Burmah ".

The specimen standing as the type in the B.M. (N.H.) is a ♀, has a bright ochreous underside, a fore wing band ending far short of the costa, and a label reading " E. Indies ". It thus agrees neither in sex, colour, markings nor data with Moore's description. But a search through the main collection disclosed a ♂ agreeing well with the original description, labelled " Himalaya " and " E.I.C. 60–15 ". After careful rechecking I am satisfied that this is the true holotype of *Thecla onyx* Moore, and I have inserted it in the B.M. (N.H.) Type Collection, suitably labelled. The currently accepted nomenclature is not disturbed.

Both sexes of this well known subspecies are variable in size, colour and markings.

A valuable series of 28 ♂ and 11 ♀ from the Naga Hills, Assam, ex coll. Tytler, has full data labels and thus elucidates the pattern of the seasonal variation in this region, which is paralleled in other non-tropical areas. Four representative ♂♂ have been dissected and all have the dentate clasp.

The wet season form (f. *onyx* Moore) is larger (fore wing length 13–16 mm.), dark and well marked. The upperside is much darker and duller than *cingalensis* ; both wings usually have broad terminal borders, with the blue dull and often suffused with violet ; the fore wing black costal border fills at least the anterior half of, and often all, the cell. The underside is comparatively dark olive brown, with bold markings.

The dry season form (f. *arta* Fruhstorfer) is smaller (fore wing length 12–14 mm.) and much paler, dull blue with narrower greyish borders and the white fore wing patch more extensive on the upperside. On the equally paler underside the outer halves of each wing become light grey, and the tornal spots are reduced to dots and yellow crowned.

B.M. (N.H.) ♂ Holotype, Himalaya ; 143 ♂, 99 ♀, North India (Kumaon–Sikkim), Assam (including the holotype of *arta* Fruhstorfer), Burma, Thailand.

H. onyx rana de Nicéville

Horaga rana de Nicéville, 1889 : 283, pl. 14, fig. 10. South Andaman Is.
H. ouyx [sic] *rana* de Nicéville ; Fruhstorfer, 1912 : 232.

This is a most distinct large race with intensely contrasted colouring above and below. It was also figured by Swinhoe (1911 : pl. 707, figs. 4, 4a, 4b). Fore wing length 15–17 mm.

The upperside is black, with the fore wing discal white spot smaller than usual (so reminiscent of mainland *syrinx* which is not recorded from these islands) ; the ♂ bears a dusting of bright blue over the greater portion of the hind wing and usually the dorsal area of the fore wing. The underside is rich dark chocolate-brown with broad white median bands, showing some seasonal variation, particularly in the intensity of the hind wing terminal markings.

B.M. (N.H.) 17 ♂, 15 ♀, Andaman Is. ; 1 ♂, Nicobar Is., 1 ♂, " Burma ".

H. onyx zuniga Fruhstorfer

B. [sic, for *H.*] *onyx zuniga* Fruhstorfer, 1912 : 233. Nias.
H. moulmeina zuniga Fruhstorfer ; Fruhstorfer, 1914 : 35.
H. onyx zuniga Fruhstorfer ; Corbet, 1941 : 49.

Figured by Seitz ; pl. 157, figs. i5, i6, ♂ ; i7, ♀.

This is another distinctive island race, but small and pale in very marked contrast to its neighbour *rana*.

The upperside is pale dull violet with narrow brown borders, the white bands visible from below by transparency ; the fore wing white patch is small and diffuse, and clear of the dull brown border. The underside is rather dark ochreous grey with clear white bands.

Fore wing length ♂ 13 mm., ♀ 14 mm.

B.M. (N.H.) ♂ Holotype, 6 ♂, 1 ♀, Nias Is.

H. onyx sardonyx Fruhstorfer

(Pl. 1, fig. 3 ; Pl. 2, fig. 18)

H. moulmeina sardonyx Fruhstorfer, 1914 : 33. N.E. Sumatra.
H. onyx sardonyx Fruhstorfer ; Corbet, 1941 : 49.

Not previously figured.

It has often been remarked that insect forms from Sumatra and Malaya, and to a lesser extent Borneo, are similar. This may be the case with *onyx*, but it seems so scarce in the area that there is insufficient material to decide whether the one subspecific name available can be applied to all. Provisionally I do so.

True N.E. Sumatran *sardonyx* is represented in B.M. (N.H.) by the three specimens mentioned by Fruhstorfer (l.c.), and also by de Nicéville & Martin (1896 : 479) who remarked " from Selesseh to Bekantschan (i.e. at 2,500 ft., between Medan and the Central Battak Mountains) . . . very rare, as Dr. Martin has not obtained more than 4 specimens in 13 years ".

The fore wing upperside has a very quadrate white patch set in a broad black apex and termen and resting on the inner half of vein 2, the black border running inwards under vein 2 to below the centre of the white patch ; the blue area internal to the border and the patch just enters the lower (dorsal) half of the cell. The hind wing costa above vein 6 is brown as usual, the remainder of the wing being basally blue shading evenly to a dull brown termen with the usual white submarginal and black marginal lines. The underside is dull ochreous grey ; the fore wing white band, though not extending above vein 7 with the dark line, is sharply widened below it, to measure 3 mm. at vein 3.

Two ♂♂ from Banka Island, over 600 miles away off S.E. Sumatra, are very similar, but the intervening and the western forms from this vast area seem to be entirely unknown.

A ♂ and ♀ from North Borneo are similar, but paler below with broader bands, that on the fore wing reaching the costa, while the upperside white patch is more diffuse and extends just below vein 2. There is no similarity between these two specimens and *corniculum* Druce (see under *syrinx maenala*).

The fore wing lengths of all the foregoing are ♂ 13, ♀ 15 mm.

Specimens from Singapore tend to be smaller (♂ 11–13, ♀ 13–14 mm.), darker, and with less extensive white markings (Pl. 1, fig. 3), but the anterior taper of the fore wing underside band is still marked and serves to distinguish them from *syrinx maenala* (Pl. 1, figs. 6, 9). These were taken flying in about equal numbers with *syrinx maenala*, often on the same day, in 1937–38 and 1952–53, and the series of each species include pairs taken *in cop.*

B.M. (N.H.) ♂ Holotype, 2 ♂, N.E. Sumatra ; 2 ♂, Banka (*Hagen*) ; 4 ♂, 1 ♀, Singapore (*Cowan*), 1 ♂, 1 ♀, N. Borneo.

H. onyx fruhstorferi Corbet

(Pl. 1, fig. 4)

H. onyx fruhstorferi Corbet, 1941 : 50. Central Java.

As is the case with *syrinx*, the transit to Java results in reduction of black colour and extension of blue and white. The appearance is very reminiscent of the Ceylon race.

Despite the large series of *syrinx onychina* from Java in B.M. (N.H.), there is only the unique specimen of *onyx fruhstorferi*. The latter is much smaller (fore wing length 13 mm.), with broader black borders (but not so broad as in *sardonyx*), and the blue areas slightly tinged with violet. The fore wing white patch extends well below vein 2.

B.M. (N.H.) ♂ Holotype, Central Java, 1,500 ft.

H. onyx akronyx subsp. n.

(Pl. 1, fig. 5)

The name is taken from the Greek ακρον = furthermost, though ἀκρονυξ = tip of fingernail. Sambawa marks the southern known limit of the species.

Matching *fruhstorferi* in size, *akronyx* ♂ has a distinctly more pointed apex and straighter termen to the fore wing.

The upperside blue colour is brighter and the white patch ovate rather than quadrate, while the black borders are more restricted ; a white submarginal line appears at the fore wing tornus. The holotype ♂ has a small black wedge anterior to the white patch at the base of vein 2 which is lacking in the paratypes.

The underside is as in *fruhstorferi* but with slightly narrower white median bands.

The ♀ is similar to the ♂ but larger (fore wing 15 mm. against 13–14 mm.), paler, and with more diffuse white markings.

B.M. (N.H.) ♂ Holotype, ♀ Allotype, and 2 ♂ Paratypes, Sambawa (*Doherty*, September 1891).

H. onyx moltrechti Matsumura

Horaga moltrechti Matsumura, 1919 : 604, pl. 47, fig. 9. Formosa.
Horaga asakurai Nire, 1920 : 376. Formosa (Pulisha or Horisha).
H. onyx moltrechti Matsumura [syn. *asakurai* Nire] ; Shirôzu, 1960 : 312, 313, fig. 346 ; pl. 67, figs. 715–718.

Shirôzu's figure of the ♂ valva and illustrations of the insects are excellent. I have followed his synonymy.

Matsumura and Nire attribute the name *moltrechti* to Oberthür but no justification for this can be found.

This subspecies is probably as variable seasonally on the Asian mainland as *onyx* from India, but the specimens available all approach the dry season form, compared with which the ♂ is generally larger and of a richer blue and less black on the upperside, while the underside is pale grey with obsolescent white bands and tornal black dots. The ♀ is heavily black-dusted above, and ochreous brown below. Fore wing length 14—17 mm.

B.M. (N.H.) 2 ♂, Hongkong ; 1 ♂, 2 ♀, Formosa.

HORAGA SYRINX

(Pl. 1, figs. 6–9 ; Pl. 2, fig. 19)

Though not known west of Sikkim nor north-east of the southern Philippines, this species ranges far south to New Guinea. It is the only species which is known to straddle both Wallace's and Weber's Lines, and it shows interesting reactions to each which may be anticipated in other species. It also has a very distinctive appearance in the " Neomalayan " area of Sumatra–Malaya–Borneo.

It is sometimes very close to *onyx* in appearance, but can usually be identified by its slightly larger size, a more pointed fore wing with straighter termen, and brighter, more distinct, markings. The ♂ genitalia are as small as those of *onyx*, and it has the same short abdomen.

H. syrinx sikkima Moore

Horaga sikkima Moore, 1883 : 525. Darjiling.
H. moulmeina sikkima Moore ; Fruhstorfer, 1914 : 35.
H. syrinx sikkima Moore ; Corbet, 1941 : 50.

Nowhere well illustrated.

The description of this subspecies immediately follows that of *moulmeina*, of which it has often been made a synonym. It appears sufficiently distinct, with a fair amount of seasonal variation parallel to, but less pronounced than, that of *onyx*.

It is large (fore wing length 15–18 mm.), robust and dark. On the ♂ upperside the black fore wing borders fill the cell and the outer quarters of spaces 1 ; often the base is black, leaving only a small subdorsal area of dark blue ; the white patch is nearly as large as in *onyx* but crossed by black veins which give it a granular appearance ; the hind wing costal border is broad and the terminal diffuse, leaving a discal area of dark blue more or less crossed by black veins. The ♀ is duller overall, with the white patch diffuse. The underside is bright ochreous yellow, and the fore wing white median band is strongly dilated centrally.

B.M. (N.H.) Holotype, Darjiling; 17 ♂, 12 ♀, Sikkim, Bhutan, Assam.

H. syrinx moulmeina Moore

Horaga moulmeina Moore, 1883 : 525. Moulmein.
H. onyx moulmeina Moore ; Fruhstorfer, 1912 : 232.
H. moulmeina moulmeina Moore ; Fruhstorfer, 1914 : 35.
H. syrinx moulmeina Moore ; Corbet, 1941 : 50.

Nowhere well illustrated, this subspecies is transitional to the Malayan one. It is smaller than *sikkima* (fore wing length 14–16 mm.) ; the upperside white patch is more compact, seldom showing in the cell nor below vein 2 in the ♂ ; the blue areas are brighter and more extensive, usually filling the fore wing base and reaching the hind wing termen, where the border is replaced by some black marginal spots in spaces 2 to 5. The underside is distinctly darker ochreous and the median bands narrower.

B.M. (N.H.) ♂ Holotype, Moulmein ; 4 ♂, S. Burma to Mergui. The specimen reported by Godfrey (1930 : 346) under *H. halba* from Renong (S. Thailand) is probably this.

H. syrinx artontes Fruhstorfer

(Pl. 1, fig. 7)

Horaga affinis artontes Fruhstorfer, 1912 : 233. Nias Is.
H. syrinx artontes Fruhstorfer ; Corbet, 1941 : 50.

Not previously illustrated.

This remarkable race does not follow the trend of *onyx zuniga*, but is large and silvery, like species of *Marmessus* in this remote island. The unique ♂ specimen is as large as any from Neomalaya (fore wing length 17 mm.). The upperside is pale shining grey-blue with very narrow dark grey borders; the white spot is small and narrow, edged with black and well clear of the border; the hind wing white median band shows through from below, and the terminal white and black lines and white cilia are very prominent.

The underside is normal, the ground colour being rather dark brownish ochreous.

B.M. (N.H.) ♂ Holotype, Nias (no further data).

H. syrinx maenala (Hewitson)

(Pl. 1, figs. 6, 9)

Myrina maenala Hewitson, 1869 : Suppl. 7, pl. 3, figs. 85, 86. Borneo.
Horaga halba Distant, 1886 : 460, pl. 44, fig. 23. Penang (♀). **syn. n.**
Horaga corniculum H. H. Druce, 1895 : 611, pl. 34, fig. 8. Kina Balu. **syn. n.**
Horaga affinis H. H. Druce, 1895 : 611, pl. 34, fig. 9. Kina Balu and Labuan.
H. onyx corniculum Druce; Fruhstorfer, 1912 : 232.
H. affinis affinis Druce; Fruhstorfer, 1912 : 233.
H. moulmeina (?) *corniculum* Druce; Fruhstorfer, 1914 : 35.
H. moulmeina halba Distant; Fruhstorfer, 1914 : 35.
H. maenala (Hewitson); Seitz, 1926 : 982.
H. onyx halba Distant; Corbet, 1941 : 49.
H. onyx corniculum Druce; Corbet, 1941 : 49.
H. syrinx maenala (Hewitson); Corbet, 1941 : 50.
H. syrinx affinis Druce; Corbet, 1941 : 50.

The authors' illustrations quoted above are good. Seitz copies those of *corniculum* (pl. 147, figs. b8, c1) and *affinis* (pl. 147, figs. c2), but not very clearly.

The appearance of *onyx sardonyx* throughout the Neomalayan area (Sumatra–Malaya–Borneo), and its differentiation from *syrinx maenala*, have already been discussed, and my illustrations on Pl. 1 are designed to illustrate the Malayan forms of both in Singapore. The latter species also presents a fairly homogeneous, but variable appearance in the area. Its distinctive characteristics are the dark pointed fore wing of the ♂, and the greatly reduced white markings—more so than in *onyx*—of both sexes.

The variability and lack of material combined to confuse the nomenclature. The three names given to individual Bornean specimens respectively denote the two distinctive extreme ♂ forms, and the normal one (*maenala*, with an obsolete white patch, the unique *corniculum* with a large one, and the intermediate *affinis*). Distant's figure of *halba*, a ♀ from Penang with the narrow even fore wing median band, suggested synonymy with form *affinis*, and this was confirmed by the accidental discovery of the holotype (Cowan, 1966).

The normal form is not far from *moulmeina*, but even smaller (fore wing length ♂ 13–15, ♀ 13–16 mm.), and distinctly darker. The ♂ upperside is bright shining blue with the apical half of the fore wing quite black and the white spot very small, sullied, and black-veined. The white spot in the ♀ is clear, but inwardly black-edged.

The name *affinis* has on occasion been wrongly accredited to Staudinger.

The B.M. (N.H.) series are subdivided for clarity :

f. *maenala* ♂ Holotype, Borneo. 1 ♂, Langkawi Is. (*Stubbs*).

f. *affinis* 1 ♀, Langkawi Is. (*Miller*). 4 ♂, 5 ♀, Penang (*Kerr*, ♀ Holotype of *halba* Dist. ; *Adams, Lakatt and Pambu*). 2 ♂, 1 ♀, Malaya. 2 ♂, 2 ♀, Singapore (*Cowan*, includes pair taken *in cop.*). 2 ♀, N.E. Sumatra ; Selesseh and Bekantschan (*Martin*). (These do not pair off with the 3 ♂ *sardonyx* already discussed). 4 ♂, 1 ♀, Banka (*Hagen*). 11 ♂, 2 ♀, Borneo ; Kina Balu and Brunei.

H. syrinx onychina (Staudinger)

Sithon onychina Staudinger, 1889 : 113. Java.
Horaga holothura Swinhoe, 1894 : 430. E. Java ; Malang. **syn. n.**
H. onyx holothura Swinhoe ; Fruhstorfer, 1912 : 232, " probably W. Java ".
H. onyx onychina (Staudinger) ; Fruhstorfer, 1912 : 232. E. Java.
H. moulmeina holothura Swinhoe ; Fruhstorfer, 1914 : 35. W. Java.
H. moulmeina onychina (Staudinger) ; Fruhstorfer, 1914 : 35. E. Java.
H. syrinx onychina (Staudinger) ; Corbet, 1941 : 50. Java.
H. syrinx holothura Swinhoe ; Corbet, 1941 : 50. E. Java.

Well illustrated by Seitz (pl. 157, figs. i2 ♂, i3, i4 ♀) ; also, but surprisingly poorly, by Piepers & Snellen (1918 : 103, pl. 27, figs. 164a, b). The misspelling *holothuria* has often occurred.

Fruhstorfer and others believed that different subspecies fly in East and in West Java. I cannot find this proved for our group of Lycaenidae. There is some variation in *H. syrinx* here, but Kalis (1933 : 85–86) investigated the parallel but even more pronounced case of *Marmessus ravindra* Horsfield in the island and found that variation was seasonal rather than geographic ; that a large race flew throughout the island, with smaller individuals in part of the year in the eastern portion.

In the several long series of the species in the B.M. (N.H.), including Fruhstorfer's, many with coloured labels for East, West and Mid-Java, no seasonal data are given, and locality seems to have no influence on appearance.

High mountains and volcanoes are evenly distributed throughout the island, so are unlikely to affect the issue.

Staudinger referred to the " magnificent " large form in his description, as did Swinhoe when describing his four specimens from Malang as " expanse 1·4 inches " (equivalent to fore wing length over 18 mm.). Swinhoe's type specimen, however, is definitely small, with fore wing length only 15 mm.

I regard the Javan subspecies of *H. syrinx* as *onychina* Staudinger, with synonym *holothura* Swinhoe, which name cannot be applied to West Javan specimens but there may be a case for using it as a seasonal form name in East Java.

The normal form throughout the island is in the ♂ brilliant bright blue with the inner edge of the very narrow apical border semicircular from base to tornus on the fore wing, and the white discal patch large, diffuse and ovate. The ♀ upperside is similar, but the blue areas are strongly tinted with violet and the hind wing white band shows through from below. The median bands on the underside are complete and very broad. Fore wing length is 15–17 mm.

B.M. (N.H.) 68 ♂, 19 ♀, West, Central and East Java (including the ♂ holotype of *holothura* from E. Java).

H. syrinx privigna Fruhstorfer **stat. n.**

Horaga privigna Fruhstorfer, 1897 : 7, 113. Lombok.
H. onyx privigna Fruhstorfer ; Fruhstorfer, 1912 : 232.
H. moulmeina privigna Fruhstorfer ; Fruhstorfer, 1914 : 35.

Nowhere illustrated. Described from a single ♀.

This subspecies is very similar to Javan specimens ; fore wing length 17 mm. The white discal patch on the upperside is slightly smaller, compressed by the broader dark borders, which are also wide on the hind wing. The fore wing underside white band was correctly described as longer and narrower than in Java, reaching the costa, but Seitz (p. 982) transposed this to short and broad.

Bali ♀♀ are similar to *privigna* on the upperside but have the broad band below like Javan ones.

B.M. (N.H.) ♀ Holotype, Lombok ; 3 ♀, Bali.

H. syrinx decolor (Staudinger) **stat. n.**

Sithon onyx var. *decolor* Staudinger, 1889 : 112. Palawan.
H. onyx decolor (Staudinger, 1898 [sic]) Fruhstorfer, 1912 : 232.
H. moulmeina decolor (Staudinger) ; Fruhstorfer, 1914 : 35.

Nowhere illustrated. Described by comparing it with " *onyx* Moore from Sikkim and Amboina ".

The upperside blue is very much reduced, particularly in the ♂. The underside is deep olive yellow, the hind wing with a series of black terminal spots above the tornal ones. Probably quite close to *paulla* (see below). Fore wing length 17 mm. (♀).

B.M. (N.H.) 1 ♀, Palawan.

H. syrinx joloana Fruhstorfer **stat. n.**

Horaga onyx joloana Fruhstorfer, 1912 : 232. Jolo Is.
H. moulmeina joloana Fruhstorfer ; Fruhstorfer, 1914 : 35.

Nowhere illustrated. Probably very like the next subspecies, *paulla*.

Fruhstorfer's brief description of this race is that it differs from *decolor* in being more violet-blue above, with the fore wing white spot larger.

H. syrinx paulla Fruhstorfer **stat. n.**

Horaga onyx paullus Fruhstorfer, 1912 : 232. Bazilan Is.
H. moulmeina paullus Fruhstorfer ; Fruhstorfer, 1914 : 35.

Nowhere illustrated. The holotype was so small that a dissection was made to prove its species. It is a good *syrinx* (Pl. 2, fig. 19). The fore wing length is 13 mm.

Translating Frustorfer's original description :

> " Smaller than *decolor* (Seitz wrongly says ' larger '), upperside darker blue with very wide black apical border ; a large rather quadrate clear white discal patch ; below greenish yellow with a light brown apical wash and the white median band broken in the centre, its hind portion suffused with greenish."

As this and the two preceding subspecies are so little known and perfunctorily described, and since their territory is a nodal one between those of Borneo westwards so far discussed, those of the Philippines, and those ranging south and east through Celebes and Halmahera, a fuller description of this key specimen is given. The possibility of its being a chance dwarf should be borne in mind.

The fore wing above is black, with a shining blue dark-dusted area confined to a semicircle with diameter on the basal half of the dorsum, and barely entering the cell ; the white discal patch being clearly defined on the black ground, 2½ mm. wide by 3½ mm. along its straight inner edge which lies obliquely from the origin of vein 5 to below vein 2. The hind wing is black with some blue dusting in the cell and just beyond, a prominent white anteterminal line, black terminal line, and white cilia. The tails are normal.

The rich ochreous brown underside has some postdiscal dark grey shading external to the white fore wing band which is short and broad, measuring as on the upperside ; the hind wing band is narrow and broken in the centre ; above the tornal black spot in space 2 are three well defined submarginal black spots crowned with white lunules at the ends of spaces 3, 4, and 5 ; the normal tornal metallic green scaling runs into space 3.

B.M. (N.H.) ♂ Holotype, Basilan (*Doherty*, February/March 1898).

H. syrinx camiguina Semper **stat. n.**

Myrina ciniata Hewitson ♀ var. Mindanao ; Hewitson, 1869 : Suppl. 6, pl. 3, fig. 84.
Horaga camiguina Semper, 1890 : 216. Camiguin Is.
H. ciniata camiguina Semper ; Fruhstorfer, 1912 : 233.

There are two Camiguin Is. (at least). One is just north of Luzon. This one is just north of Mindanao.

Semper described this subspecies by comparing it with Hewitson's 1869 figure of the underside of his ♀ variety from Mindanao of *ciniata*. His two ♀♀ differed in having a larger, unmarked, almost semicircular white spot on the fore wing upperside (for which he must have used Hewitson's 1863 fig. 31 on pl. 14), and a narrower, more regular white median band on the hind wing underside.

The fore wing length is given as 15 mm. which, though compatible with the ♂ *syrinx paulla*, is small for other ♀♀ in the region.

Till further material of both sexes is available this name must stand for Mindanao specimens as well.

The name has on occasion been misspelt *caminguina*.

H. syrinx permagna Fruhstorfer

Horaga ciniata permagna Fruhstorfer, 1912 : 233. Toli Toli, N.W. Celebes.
H. syrinx permagna Fruhstorfer ; Corbet, 1941 : 50.
(" *Myrina ciniata* ♂ " Hewitson, 1869 : Suppl. 6) (no loc.).

Figured by Seitz : pl. 158, fig. a3 (♀ nec ♂ ?).

Fruhstorfer described *permagna* by comparing it with " *ciniata* Hew. ; type from South Celebes ", than which it was larger and with wider white markings above and below. He did not indicate its sex, but his description, and Seitz' illustration in particular, fit a ♀.

There are two ♂♂ in B.M. (N.H.), one ex colls. Boisduval and Rothschild labelled " Celebes ", the other ex coll. Hewitson labelled " Celeb." and, in a later hand, " Calabar ". The latter stood as the type of *ciniata* Hew., an untenable position (q.v. below) but one which had apparently misled Fruhstorfer and others. The two are identical and, with a fore wing length of 18 mm., a good match for the ♀ *permagna*, which name I apply to cover all Celebes until further material is obtained from different parts of this vast and interesting complex of peninsulae.

Wallace (1869 : i, 280) noted that Celebes insect races, particularly in butterflies, have exceptionally large and elongate pointed forewings. This feature is apparent in these two ♂♂.

There is no blue on the upperside of this subspecies, which is intense black in the ♂, less intense in the ♀, with a comparatively small but clear white fore wing patch ; the hind wing has some pale shading at the cell-end and mid-costa. The underside is marked with terminal spotting on the hindwing as in *paulla*.

B.M. (N.H.) 2 ♂, Celebes ; 2 ♀, Palos Bay, W. Celebes (*Doherty*).

H. syrinx samoena Grose Smith **stat. n.**

Horaga samoena Grose Smith, 1895 : 513. Batchian (♀ nec ♂).

Grose Smith described under this name a very small ♂ (fore wing length 14 mm.) and three ♀♀ (17–18 mm.). His two type specimens and the two syntypes (no actual holotype having been designated) are in the B.M. (N.H.). The discrepancy in size is significant ; the ♀♀ are compatible with *syrinx* but the ♂, which has no sexual insignia, is not, and I bracket it with and discuss it later under *ciniata* for reasons there given.

I select from his two types the ♀ as the LECTOTYPE of *samoena* Grose Smith. His description is accurate. The upperside is dark brown, unmarked except for the oblique white patch which is ovate, sullied, and crossed by two dark veins, and the dull whitish submarginal line on the hind wing. The underside is normal for the species, with the inclusion of the diminishing series of subterminal black dots, each with white lunule, at the ends of spaces 2 to 6 of the hind wing.

The fore wing length is 18 mm. In size and markings it closely resembles Seitz' figures for *permagna* upperside (1926 : pl. 158, fig. a3) except that the white patch is small and dusky ; and for *ciniata* underside (l.c., fig. a2) except for its greater size.

A fourth ♀ taken by Waterstradt has rather wider and clear white markings but is otherwise similar.

B.M. (N.H.) ♀ Lectotype and 1 ♀, Batchian (*Doherty*, March 1892). 1 ♀, Halmahera (*Doherty*, August 1892). 1 ♀, Batchian (*Waterstradt*).

H. syrinx syrinx (Felder)

Myrina syrinx C. Felder, 1860 : 452. Amboina.
M. onyx Moore ; syn. *syrinx* Felder ; Hewitson, 1865 : 40, line 3.
H. syrinx (Felder) Moore, 1883 : 525. " confined to Amboina ".
H. syrinx (Felder) ; Fruhstorfer, 1897 : 115.
H. syrinx syrinx (Felder) ; Corbet, 1941 : 50.

These are the only references to this name, and it has not been illustrated.

♂ upperside lustrous bright blue with a purple sheen ; the fore wing costa and outer third, hind wing costa and inner margin all black ; the fore wing discal white patch large and clear ; a hind wing subterminal row of black dots followed by the white and the black marginal lines prominent before the white cilia ; traces of the white median band are visible on the hind wing from below, and the lobe is marked with blue metallic scales.

♀ upperside dark brown, *the wing bases suffused with pale purple-blue which may reach the hind wing termen ;* the fore wings with a shortened discal band. Underside ochreous with a white discal band on all wings ; the hind wings with four terminal black spots inwardly edged with shining blue.

The description of the ♂ upperside is from a Ceram specimen in good condition. That of the ♀ and the underside is translated from Felder's with my addition in italics, and agrees with ♀ specimens before me. He called the white patch on the fore wing upperside " *abbreviata* " because there were at the time no comparable species known ; as a discal band in the normal sense it is short, but compared with the allied species we now know the patch is long, from vein 1 to the upper apex of the cell.

Felder's type specimen, so marked ex coll. Rothschild, survives in very battered condition with three wings parts of which are transparent, but traces of the blue colour are left. The abdomen attached to her looked strange and, on dissection, proved to be that of a totally unrelated ♂. This specimen has only recently been found, but it proves that Corbet was correct in his diagnosis of the taxon, and corroborates his remark on the omission of any reference to the blue colour by Felder. Further evidence that blue was present may be adduced from Hewitson's rejection of *syrinx* as being a synonym of *onyx* Moore. This was an unwarranted confusion of localities which Moore tried to rectify jointly with the similar error in the case of *ciniata* Hewitson, when he averred that *syrinx* Felder was confined to Amboina and *ciniata* to Batchian. These two valid corrections unfortunately remained overlooked.

B.M. (N.H.) ♀ Holotype, Amboina. 1 ♀, Amboina (*Doleschall* & *Martin*, 1891 ; ex colls. Van der Poll and Adams). 1 ♂, 5 ♀, Central Ceram (*C.F.* & *J. Pratt*, 1919).

H. syrinx schoutensis Joicey & Talbot **stat. n.**

(Pl. 1, fig. 8)

Horaga schoutensis Joicey & Talbot, 1916 : 79. Schouten Is.
H. onyx schoutensis Joicey & Talbot ; Seitz, 1926 : 982.

Here illustrated for the first time. The Schouten Islands referred to are those off north-western, not central, New Guinea.

This is an interesting extension of the species, apparently well established and widespread. The size (fore wing length 16–18 mm.) and ♂ genitalia entirely conform to the *syrinx* stamp.

The ♂ upperside is black, with the white patch semicircular and large ; the basal half of the dorsum is pale shining blue, which colour reappears diffusely and to a variable extent in the hind wing cell. The ♀ is duller ; dark grey with more white and little blue.

The underside is ash-grey, slightly ochreous at the hind wing tornus, and the white median bands broad and outwardly diffuse.

B.M. (N.H.) ♂ Holotype, Biak Is. (*A.C. & F. Pratt*, June 1914, labelled " *schoutensae* "). 5 ♂, 1 ♀, Roon Is. (*C.F. & J. Pratt*, July 1920). 1 ♂, Ron Is. (*Doherty*, July 1897). 1 ♂, Dorey (*Doherty*, April 1897). 2 ♂, Mefor Is. (*Doherty*, June 1897 ; *C.F. & J. Pratt*, August 1920—the specimen illustrated). 1 ♀, Ambabaki (*Laglaise*). 1 ♂, 1 ♀, Hydrographer Mts. (*Eichhorn* Bros., April 1918).

Note : these localities are, from west to east :

Ambabaki ; central on the north-facing coast of the N.W. peninsula of New Guinea at Lat. ½° S., Long. 133° E.
Dorey ; Manokwari, just south of Cape Manori ; 1° S., 134° E.
Mefor Is. ; west entrance to Great Geelvink Bay ; 1° S., 135° E.
Ron, = Roon Is. ; } S.W. quarter of Great Geelvink Bay ; 2½° S., 134½° E.
Biak Is. ; east entrance to Great Geelvink Bay ; 1° S., 136° E.
Hydrographer Mts. ; over 1,000 miles away in Papua ; 9° S., 148½° E.

HORAGA ALBIMACULA

(Pl. 1, figs. 11, 12 ; Pl. 2, fig. 20)

Save that it has not yet been recorded from Sumatra and Nias, this little species is known so far from all the territory of *onyx*, and from all that of *syrinx* except south-east from Borneo, in which island it seems very rare. This is a new concept of the range of the species ; it has only recently been recognized that it has a subspecies in Ceylon and India, and it is now extended to Bali, Celebes, the Philippine area and Formosa.

The wings appear comparatively narrower than those of *onyx* and *syrinx*, and less rounded than in *amethysta*. On the hind wing underside the white band is obsolescent, leaving usually only the dark median line which, as in *amethysta*, is prominent and often heavily overlaid with metallic green scales. The upperside is normally very dark brown, but some subspecies are blue or purple-blue and a few are interesting in having occasional purple-blue forms. The white patch on the fore wing upperside is always prominent.

It is possible but unlikely that *albimacula* might have to give way to *ciniata* as the specific name for a senior subspecies in Batchian. This is discussed later.

The species is remarkable in having so many races described from unique specimens. I add two more, in Bali and Celebes.

H. albimacula viola Moore

Horaga viola Moore, 1882 : 248. Dharmsala (Kangra, N. India).
H. albimacula viola Moore ; Woodhouse, 1952 : 138, pl. 20, fig. 22.

Illustrated by most authors on Indian species.

The sexes are alike, though the ♀ occasionally has traces of purple-blue basal scaling on the upperside. This is very dark brown, and the usual white fore wing patch is sometimes suffused with pale orange. The underside ground colour is dark ochreous brown.

The size is variable ; fore wing length 10½–14 mm. (9 mm. in some very small ♂♂).

There are three specimens labelled types in the B.M. (N.H.) Type Collection ; (1) a brown ♂ labelled " Sikkim 1886, O. Möller.", ex coll. Elwes ; (2) a brown ♀ labelled " Horaga viola ♂ Type, Moore " and " Kangra " (this is bodyless but I diagnose sex by size and wing profile) ; and (3) a blue ♀ labelled as last but " ♀ Type ". The first by its date and locality cannot be a Type ; Moore's description gave " Dharmsala ; type in B.M.", Dharmsala being in Kangra. The second and third agree with the original description of the respective sexes, the former is a *viola* as currently recognized and the latter an *onyx*, and both are ♀♀. I now select the second of the three, the specimen labelled and described by Moore as *Horaga viola* ♂, to be the LECTOTYPE ♀ of *Horaga viola* Moore (1882 : 248). It agrees with my description above, having no trace of blue colour on the upperside. The current nomenclature is not disturbed.

B.M. (N.H.) ♀ Lectotype, Kangra ; 29 ♂, 9 ♀, S. India, Sikkim, Assam, Burma ; (also known from Ceylon).

H. albimacula albimacula (Wood-Mason & de Nicéville)

Sithon albimacula Wood-Mason & de Nicéville, 1881 : 249. Andamans.
Horaga albimacula (Wood-Mason & de Nicéville) ; de Nicéville, 1889 : 284, pl. 14, fig. 9.
H. albimacula albimacula (Wood-Mason & de Nicéville) ; Corbet, 1941 : 48.

The illustration quoted is good, and well shows how this very dark and richly marked subspecies faithfully repeats the features of its compatriot *onyx rana*, figured with it.

The upperside is black with a large white patch, and the centre and disc of the hind wing are deep shining violet, leaving a regular terminal border. The underside ground colour is rich deep brown.

The fore wing length is 10–12 mm.

B.M. (N.H.) 9 ♂, 1 ♀, Andaman Is.

H. albimacula malaya Corbet

Horaga albimacula malaya Corbet, 1941 : 48. Singapore.

Nowhere illustrated, this subspecies is very similar to *viola* but in both sexes all wings are often heavily sprinkled in the basal areas with purple-blue scales, and the white fore wing patch is slightly narrower. The fore wing length is 11–12 mm.

Described from Singapore, it flies there with *onyx sardonyx* and *syrinx maenala*, and is also known from peninsular Malaya.

B.M. (N.H.) ♂ Holotype, ♀ Allotype, Singapore, and 2 ♂, Singapore (*Cowan*), one with and one without blue scaling.

H. albimacula anara Fruhstorfer **stat. n.**

Horaga anara Fruhstorfer, 1898 : 180. East Java.
H. anytus anara Fruhstorfer ; Seitz, 1926 : 982, 1116, pl. 157, fig. i9.

Seitz' figure is good. Also illustrated (as *anytus*) by Piepers & Snellen (1918 : 103, pl. 27, fig. 165).

This race is very like *viola* but paler below, and the fore wing white areas on both surfaces are wider. Small ; fore wing length 11 mm.

B.M. (N.H.) ♂ Holotype, Lawang, East Java.

H. albimacula violetta **subsp. n.**

(Pl. 1, fig. 12 ; Pl. 2, fig. 20)

This is a surprising and very distinct specimen from Bali. It is large for the species ; fore wing length 14 mm.

The ♂ upperside is pale violet-blue of a powdery appearance ; the dark brown costal border almost fills the fore wing cell, continuing round the apex to form terminal borders 2 mm. wide on both wings ; the white fore wing patch is large and semicircular. The underside is exactly as in *viola* except for the much wider fore wing band.

B.M. (N.H.) ♂ Holotype, Bali (low country, *Doherty*, April 1896).

H. albimacula bellula Fruhstorfer **stat. n.**

Horaga bellula Fruhstorfer, 1897 : 114. Sambawa.
H. anytus bellula Fruhstorfer ; Fruhstorfer, 1912 : 233.

Figured by Seitz : pl. 158, fig. a8 (underside).

This is a reversion to the black and white *viola* pattern, very like *anara* from Java but darker below and with less extensive white areas. Fore wing length 12 mm.

H. albimacula chalcedonyx Fruhstorfer

Horaga chalcedonyx Fruhstorfer, 1914 : 33. " Sintang, S.W. Borneo ".
Horaga onyxitis Fruhstorfer (1914 : 34). " Sintang, W. Borneo ". **stat. & syn. n.**
H. moulmeina chalcedonyx Fruhstorfer ; Fruhstorfer, 1914 : 35.
H. onyx chalcedonyx Fruhstorfer ; Seitz, 1927 : 1116.
H. anytus onyxitis Fruhstorfer ; Seitz, 1927 : 1116, pl. 157, fig. i8.
H. albimacula (?) *chalcedonyx* Fruhstorfer ; Corbet, 1941 : 49.

The figure by Seitz is of the male upperside.

Fruhstorfer described *chalcedonyx*, immediately followed by *onyxitis*, both from " one male in coll. Fruhstorfer " and from the same locality. The type specimen of *chalcedonyx*, ex coll. Fruhstorfer and with his labels on, agreeing with his description, is in the B.M. (N.H.) and is a ♀. It is very slightly larger and with a little more blue than, but otherwise identical with, the ♀ allotype of *malaya* from Singapore, and it is clear that *chalcedonyx* is the West Borneo coastal subspecies of *albimacula*. Seitz' figure and Fruhstorfer's description of *onyxitis* can only refer to the ♂ of this subspecies, showing it to be intermediate between *malaya* and *violetta*, having a black and white fore wing upperside and a " dark violet-blue hind wing with a moderately broad black border which tapers somewhat tornally " (translated from Fruhstorfer).

Fruhstorfer himself surmised that this would prove a race of *albimacula* (= *anytus*). It differs remarkably from the next, from montane North Borneo, which has no blue.

B.M. (N.H.) ♀ Holotype ; Sintang, West Borneo.

H. albimacula albistigmata Moulton

Horaga albistigmata Moulton, 1912 : 159. Sarawak.
H. albimacula albistigmata Moulton ; Corbet, 1941 : 49.

Nowhere illustrated, this subspecies is in all respects like a small dark *viola* except that the fore wing white spot is smaller on both surfaces. The fore wing length is 10½ mm.

B.M. (N.H.) ♂ Holotype ; Madihit Hills, East Sarawak (May 1911).

H. albimacula anytus (Staudinger) **stat. n.**

Sithon anytus Staudinger, 1889 : 113, pl. 1, fig. 12. Palawan.

Yet another unique specimen named ; this time figured by the author by photograph, leaving no doubt as to its status.

The upperside is black and white as in *viola*, *anara* and *albistigmata*, with the white patch small as in the last. It differs from all these, and follows the generic trend in the area, by bearing a terminal series of black spots on the hind wing underside.

The fore wing length is 11 mm.

H. albimacula taweya **subsp. n.**

(Pl. 1, fig. 11)

Another large new subspecies. The unique ♂ lay in the series, very similar on the upperside, of *H. selina*, and was caught with it at Taweya by Doherty on his last visit to Celebes.

The ♂ upperside is brownish black, unmarked except for the fore wing white patch and the indistinct whitish submarginal line on the hind wing ; the white patch is large, the outer edge semicircular and diffuse, the inner upright not oblique, running straight from the upper apex of the cell to just beyond the centre of vein 1.

The underside is ochreous brown, only slightly darker than in *violetta* (my illustration is too dark), with the fore wing white band as on the upperside; the band on the hind wing is obsolescent as usual and the inner dark brown median line is edged outwardly with metallic green scales along its posterior half; similar green scales crown the series of black spots which, as in *anytus* and the Celebes race *syrinx permagna*, decrease along the termen from the large one in space 2 to the indistinct one in space 6.

The fore wing length is 14 mm.

B.M. (N.H.) ♂ Holotype, " Taweya, north of Palos Bay ", Celebes west coast (*Doherty*, August–September 1896).

H. albimacula bilineata Semper **stat. n.**

Horaga bilineata Semper, 1890 : 216. " Panaon, S.E. Mindanao ".

Nowhere figured. Described, like his *camiguina*, from two ♀♀, which are distinctly smaller ; fore wing length 13–14 mm.

The upperside is dark brownish grey with a comparatively large white patch. The underside is " ash-grey ", slightly darker at the fore wing apex ; the median band wide on the fore wing and nearly obsolete on the hind, where it is edged darker on both sides and marked with metallic green scales throughout its length ; similar scales crowning the full series of terminal spots.

I cannot find " Panaon, S.E. Mindanao " on the map. There is an island of that name off N.E. Mindanao, between it and Leyte, which Semper mentions in his appendix under " Fünfter Bezirk " (p. 363), Mindanao itself being in his " Sechster Bezirk ".

H. albimacula triumphalis Murayama & Sibatani **stat. n.**

Horaga anytus triumphalis Murayama & Sibatani, 1943 : 40, pls. 5 & 6, figs. 8. Formosa.

Well figured by Shirôzu (1960 : 313, fig. 346 ; pl. 67, figs. 719–722).

A pleasing closure to the range of this species. Shirôzu's illustrations show this subspecies to have the ♂ genitalia characteristic of the species, and an appearance near to the bluish forms from Malaya. The white bands on the underside are slightly better marked on the hind wing but narrow on the fore wing.

Fore wing length 12–13 mm.

HORAGA AMETHYSTA

(Pl. 1, fig. 13 ; Pl. 3, fig. 22)

Very little is known of this extremely rare and elusive species with the monstrous and specialized genitalia.

First found in Borneo, several specimens are known from different sources there, but it was not till 1941 that Corbet gathered various examples from Malaya and recognized that it also occurred in Java and Nias. Western forms are small but it increases in size eastwards. It has been taken on mountain peaks of over 5,000 feet, through all elevations down to practically sea level, and is probably, like other species of the genus, an " open hilltop " or " jungle canopy " insect.

Seitz does not illustrate, nor even mention, *amethysta*. I figure the smallest subspecies, *isna*, from Nias. The only other illustrations have been Druce's originals of 1902.

The species is distinctive on the upperside in the small size of the fore wing white spot, which is at most as deep as the width of the cell, and on the underside in the narrow linearity of the median bands and the prominence of the metallic green markings. The upperside violet colour is also of a different, uniformly shining, quality to the dusted bluish of other species.

The wings are rounded, and fore wing veins 11 and 12 tend to be more strongly bowed towards each other than usual ; in one ♀ specimen ex coll. Cator from Sandakan (" S'kan ") they palpably touch.

The possibility that the name *ciniata* may have to be adopted as the senior specific name is discussed after subspecies *amethysta*. I insert it as a floating subspecies below, awaiting positive evidence from Batchian for its correct allocation in the classification.

H. amethysta purpurescens Corbet

Horaga amethystus purpurescens Corbet, 1941 : 47. Malaya, S. Burma.

This name has on occasion been misspelt *purpurascens*.

The holotype and allotype specimens which were in the F.M.S. Museum, Malaya, until the 1939–45 war, must be presumed lost, but there survive in B.M. (N.H.) three females of Corbet's original type-series.

The upperside is deep lustrous violet with dark brown borders up to 2 mm. wide in the ♂, whose fore wing white spot is obsolescent ; in the ♀ the borders are broader and diffuse, expanding at the fore wing apex to reach the white spot, which is narrow and placed across the cell-end.

The rich ochreous underside fades to ash-grey in worn specimens, which also may lose the metallic green scales on the hind wing band.

This subspecies is similar to the Bornean one, but the borders tend to be narrower and the white fore wing spot slightly larger.

Burmese specimens are smaller, have still narrower borders and a larger spot, but these differences are slight.

The fore wing length is 12–14 mm.

B.M. (N.H.) 5 ♀, Mergui (*Evans*), Renong (2) (*Doherty*), Malaya (2) (*Corbet, Gunnery*). Other Malayan specimens in colls. Eliot and Stubbs were taken in the Cameron Highlands, Frasers Hill, on Mount Ophir summit, in the plains, and on Pulau Parit, Kerimun Is. (west of Singapore).

H. amethysta isna Corbet

(Pl. 1, fig. 13 ; Pl. 3, fig. 22)

Horaga amethystus isna Corbet, 1941 : 48. Nias Is.

An interesting specimen in good condition is small and pale, recalling its compatriot *onyx zuniga*. Fore wing length 11½ mm.

The upperside of the unique ♂ is lavender rather than violet, with a prominent round white spot at the end of the fore wing cell, below which the underside band shows through ; the borders are regular, narrow, and obsolete at the costa. The white band on the fore wing underside is relatively wide (1 mm.).

B.M. (N.H.) ♂ Holotype, Nias Is.

H. amethysta overdijkinki Corbet

Horaga amethystus overdijkinki Corbet, 1941 : 48. W. Java.

The unique ♀ is of a much bluer tint than in all other specimens of this species, but still uniform over all the upperside. The brown borders are narrower and more regular than in all other ♀♀. The fore wing white spot is larger and elongate, just extending into spaces 3 and 5. The fore wing length is 12½ mm.

B.M. (N.H.) ♀ Holotype, Mt. Halimon, Soekaboemi, W. Java.

H. amethysta amethysta H. H. Druce

Horaga amethystus H. H. Druce, 1902 : 118, pl. 11, figs. 4, 5. N. Borneo.

The ♂ upperside is deep shining violet with regular narrow brown borders and a minute white fore wing spot. The ♀, with a larger diffuse spot, has broader borders than any other subspecies so far. The underside fore wing median band is entire but linear in the ♂, straight and ½ mm. wide in the ♀ ; the hind wing band as usual is linear and completely overlaid with shining green scales.

Fore wing lengths are 12 mm. (♂), 13–14 mm. (♀).

B.M. (N.H.) ♂ Holotype, British N. Borneo. (The female allotype from " N. Borneo, probably East Coast Residency " (*Pryer*) is in coll. Hope Dept., Oxford.) 2 ♀, N.E. Borneo, Sandakan.

H. ciniata (*? amethysta*) *ciniata* (Hewitson)

Myrina ciniata Hewitson, 1863 : 35, pl. 14, figs. 30, 31. " Batchian and India ".
M. ciniata Hewitson ; Hewitson, 1869 : supplement 6. ♂, no loc.
Horaga ciniata (Hewitson) Moore, 1881 : 99. " Ceylon ".
H. ciniata (Hewitson) ; Moore, 1883 : 525. " confined to Batchian ".
H. ciniata (Hewitson) ; de Nicéville, 1890 : 417. Batchian.
Horaga samoena Grose Smith, 1895 : 513 (♂ nec ♀). Batchian.
H. ciniata (Hewitson) ; Fruhstorfer, 1897 : 114–5. N. & S. Celebes.
H. ciniata (Hewitson) ; Swinhoe, 1911 : 12. Celebes.
H. ciniata (Hewitson) ; Fruhstorfer, 1912 : 233. " Type aus Sud Celebes ".
H. ciniata (Hewitson) ; Seitz, 1926 : 982, pl. 158, figs. a1, a2. S. Celebes.
H. syrinx ciniata (Hewitson) ; Corbet, 1941 : 50. S. Celebes.

There has been unfortunate confusion and uncertainty over the identity and application of the name *ciniata* which even now cannot be fully resolved for lack of material.

Hewitson described specimens varying in size from 0·9 to 1·3 inches' expanse (equivalent by his method to fore wing lengths 11½ to 16½ mm.) from Batchian and

India, figuring the upper and undersides of a clearly identifiable ♀, though he did not state its sex. This ♀ I have located in the B.M. (N.H.) main collection, with Hewitson's labels reading " Batchian " and, glued underneath, two scraps " ciniata " and " Ba . . .". It agrees perfectly with the 1863 description and illustrations, with a fore wing length 15 mm.

In 1869 Hewitson said that his original figure " was from a female. I have since received the male, which does not differ from it except in its greater size and in the more acute apex of the anterior wing ". He increased the size range of the species now to 0·9–1·4 inches (fore wing length 11½–18 mm.).

Standing in the B.M. (N.H.) Type Collection as the type specimen of *ciniata* Hew. is a ♂, with Hewitson labels reading " Calabar " and, glued below, a scrap reading " Celeb." This ♂ has a fore wing length 18 mm., and the fore wings are very pointed. I am confident that this is the ♂ to which Hewitson referred. It is clear that it is not conspecific with the much smaller ♀♀ which Hewitson originally had named *ciniata*. Hewitson gave no more information on it than my quotation above, and no locality, though it undoubtedly came from Celebes.

Moore had obviously been studying this problem when, in 1883, in correcting his own earlier error referring to Ceylon, he said firmly that *ciniata* was confined to Batchian (and *syrinx* to Amboina). He was followed by de Nicéville, but by 1897 the false ♂ seems to have appeared and misled all later authors.

No other reference to this subject can be found, nor any explanation for the quite unwarrantable appearance of this ♂ in the status of a type specimen, and only a ruling by the International Commission on Zoological Nomenclature could now legalize such status. I do not consider a request for such a ruling justifiable. The original 1863 description of the small ♀, though confusing localities, was good, and so was the illustration of the ♀ from Batchian, which has been reproduced by Seitz, and the ♂, from a different locality, has never been described nor illustrated. I have therefore placed and discussed the ♂ already, with a second similar one from Celebes, where they belong under *syrinx permagna*.

I designate the ♀ I have referred to, ex coll. Hewitson from Batchian, to be the LECTOTYPE of *Myrina ciniata* Hewitson (1863). Hewitson's description and illustrations, the latter reproduced by Seitz, are good except that the size should be given as fore wing length 15 mm. (instead of expanse 0·9 to 1·3 inches). The specimen is in the B.M. (N.H.) Type Collection.

Under *syrinx samoena* I have already discussed Grose Smith's specimens of that name and segregated his unique small ♂ with the violet-centred hind wing as being different. It has no abdomen, palpi nor fore legs, but its wings do look masculine. Nor has it sexual insignia, so assuming it is a ♂ it must be either a subspecies of *albimacula*, one of *amethysta*, or a new species. The last is unlikely ; the size fits either of the alternatives, and both the deep violet colour and the reduced fore wing white markings indicate *amethysta*. Its 14 mm. fore wing matches well the 15 mm. of Hewitson's ♀ *ciniata*, and they may well be conspecific.

More cannot be decided until fresh material of both sexes of all species is available from Batchian. If they are conspecific, the name *ciniata* will be the senior taxon in the species I have dealt with as *amethysta* (or possibly *albimacula*). If they are distinct, the ♀ will still bear the senior name *ciniata* to the appropriate species, but the ♂ will represent a new species or subspecies, as I have already fixed the name *samoena* to apply to the Batchian race of *syrinx*.

It must be remembered that neither *albimacula* nor *amethysta* is yet known from the Batchian side of Wallace's Line although both approach it. The effect of crossing it is unpredictable and often spectacular, though in the known case of *syrinx* it is only moderate.

B.M. (N.H.) ♀ Lectotype, Batchian (ex coll. Hewitson). 1 ♂ (?), (the " ♂ Type " of *samoena* Grose Smith).

Horaga selina Grose Smith

(Pl. 1, fig. 14 ; Pl. 3, fig. 23)

Horaga selina Grose Smith, 1895 : 513. " South Celebes ".

An interesting species not listed by Seitz. Nearly half the 20 specimens in B.M. (N.H.), most ex coll. Rothschild, were collected by Doherty in 1891, the rest in 1896 ; all found by the same man in the one restricted locality. The five year interval allows one to hope the species survives there still.

The sexes are alike and the figure on Pl. 1 shows their appearance well. The upperside is very dark brown and white ; the fore wing patch long, tapered and oblique, often coated with orange scales. The underside white band is narrow and regular, and followed on the hind wing by a straight ochreous line and an irregular metallic green one before the distinctive wide postdiscal black and grey irrorated area. The fore wing length is 15–18 mm.

In effect the submarginal markings of the hind wing underside are shifted in to the discal area, and the outer third is " filled in " with the irrorations. It is interesting that this phenomenon is paralleled in the quite unrelated but also 3-tailed *Semanga superba* (Druce), a more widespread species with the fore wing and the basal half of the hind wing plain brown but whose " terminal red spots and metallic lunules " are postmedian, in a marbled grey area extending to the termen.

B.M. (N.H.) ♂ Holotype, ♀ Allotype, 6 ♀, Celebes, west coast ; Taweya, north of Palos Bay (*Doherty*, August–September 1891) ; 5 ♂, 7 ♀, the same (August–September 1896).

HORAGA LEFEBVREI

(Pl. 1, fig. 15 ; Pl. 3, fig. 24)

This aberrant Philippine species is the only one with marked sexual dimorphism on the underside, a fact which has led to some synonymy. Veins 11 and 12 of the fore wing are not so close as in other species, which caused one of the synonyms to be made in *Rathinda*.

The upperside is like that of *selina* but the white patch is ovate and more central on the fore wing, while the sub-basal area is more or less dusted with pale blue scales, particularly in the ♂.

The underside of the ♂ is shown on Pl. 1 (a specimen from Mindoro where the hind wing ground colour is uniformly ochreous). The ground colour normally is dark brown shading to chestnut at the fore wing apex and to ochreous in the dorsal half of the hind wing ; the white costal streaks, central spot, and chain of postdiscal markings (which dorsally become overlaid with metallic scales) on the hind wing are all heavily ringed with dark brown ; and there is a complete submarginal series of metallic green lunules capping black terminal spots or dots. The subtornal spots on either side of the end of hind wing vein 2 are well marked and both black.

The ♀ differs on the underside by having much more extensive white markings on both wings ; the hind wing central spot becomes subtriangular, one apex extending to the base, and the postdiscal chain is more or less conjoined.

Either sex (B.M. (N.H.) has one such of each from Luzon and a male from Mindanao) may have the whole under surface shot with a purple gloss, and the metallic markings blue instead of green.

The ♂ has a distinctive plume of suberect soft brown and grey hairs along the upper edge of the hind wing cell on the upperside, and its palpi are clothed with two forms of translucent scales giving them a greasy cream appearance below the black tip.

H. lefebvrei lefebvrei (C. & R. Felder)

Myrina lefebvrei C. & R. Felder, 1862 : 291. Luzon.
Horaga lefebvrei (Felder) Semper, 1890 : 215.
Rathinda cuzneri Schultze, 1907 : 361, pl. 1, fig. 1. Luzon. **comb., ♂ f. & stat. n.**

The name has on occasion been misspelt *lefevrei.*

Figured also by Seitz : pl. 158, figs. a4 (♂ nec ♀), a5.

The appearance has been described in the paragraphs above. The fore wing lengths are 14–17 mm. (♂), 14–18 mm. (♀).

The Felders' original good descriptions were of a normal ♂ with minimal white markings on the underside, and a normal ♀ with these markings large. The type specimens agree.

Schultze described fully, and figured by photograph, a normal ♀ with maximum white on the underside, saying that the ♂ was similar. We may avoid absolute synonymy by designating the aberrant ♂ with enlarged white markings as ♂ form *cuzneri* (Schultze) f. & stat. n.

B.M. (N.H.) ♂ holotype, ♀ Allotype, 3 ♂, 4 ♀, Luzon.

H. lefebvrei osma Fruhstorfer

Horaga lefebvrei osma Fruhstorfer, 1912 : 233. Mindanao.
♀ f. *melera* Seitz, 1926 : 983, pl. 158, fig. a7. **syn. n.**

Figured by Seitz ; pl. 158, figs. a6 (as *asma*), a7 (*as melera*).

Fruhstorfer tersely described this race as differing from *lefebvrei* in having the fore wing white spot smaller and the terminal borders darker brown on both wings below. These differences are very slight, but comparing series from Luzon and Mindanao there is a trend in the latter for all underside white markings to be smaller. The size is as *lefebvrei*, but a dwarf male in B.M. (N.H.) has a fore wing length of only 11 mm.

Seitz described ♀ form *melera* as " with very enlarged white spots and a much reduced brick-red area on the hind wing underside ". Again, as his illustration shows, this is the normal ♀, and *melera* can only be regarded as a subjective synonym of *osma* unless, as in Luzon, a Mindanao ♂ form with enlarged white markings is found. Fruhstorfer's type specimens are a small and poorly marked ♂, and a normal ♀ exactly like Seitz' illustration of *melera*.

B.M. (N.H.) ♂ Holotype, ♀ Allotype, Mindanao ; 12 ♂, 12 ♀, Mindanao (mostly Lanao Plain, June 1914, *Wileman*).

H. lefebvrei osmana subsp. n.

(Pl. 1, fig. 15 ; Pl. 3, fig. 24)

Both sexes in Mindoro show differences from the Luzon and Mindanao races which, though slight, are constant and exceed those between the latter.

The fore wing length is 13½–15½ mm., slightly smaller than *lefebvrei* and *osma*.

The fore wing upperside white area is reduced from an ovate to a narrow, almost rectangular, oblique band 2–2½ mm. wide in the ♂, 3 mm. in the ♀, and blue scaling at the base is minimal.

On the underside all white markings are much reduced in both sexes, and the hind wing ground colour is uniform rufous ochreous instead of shading to dark brown in the apical half ; the dark brown edging to the white markings is prominent and catenulate.

B.M. (N.H.) ♂ Holotype, ♀ Allotype, Mindoro (*Platen*). 4 ♂, 2 ♀, Mindoro (*Platen; Everett*, December 1894 ; *Staudinger*).

Horaga rarasana Sonan

(Pl. 1, fig. 16 ; Pl. 3, fig. 21)

Horaga rarasana Sonan, 1936 : 207, pl. 14, fig. 4. Formosa.

This species has also been well illustrated by Shirôzu (1960 : 311, fig. 345 ; pl. 67, figs. 711–714). It is most distinctive.

The illustration on Pl. 1 shows the pure black and clouded white fore wing and the black and shining violet hind wing upperside ; and the underside which is chalk white with dark brown cell-end and postdiscal bands, beyond which the terminal borders are dark ochreous on the fore wing and bright ochreous on the hind, the latter carrying the bold metallic green lunulate markings.

The fore wing length is 17 mm. (♂), 20 mm. (♀).

The fore wing costal veins 11 and 12 are only slightly bowed towards each other in this species.

B.M. (N.H.) 2 ♂, 1 ♀, Formosa ; Mt. Rara, July 1964 (*Murayama*).

SYNONYMIC LIST OF THE HORAGINI

RATHINDA Moore, 1881
    syn. *CUPIDO* Hübner, 1819 [praeocc.]
R. amor (Fabricius, 1775)   Ceylon, India, E. Pakistan.
    syn. *triopas* (Cramer, 1780)

HORAGA Moore, 1881	
H. onyx cingalensis Moore, 1883	Ceylon, S. India.
onyx (Moore, 1857)	N. India, E. Pakistan, Burma, Thailand.
f. *arta* Fruhstorfer, 1914	(dry season form).
rana de Nicéville, 1889	Andaman Is.
zuniga Fruhstorfer, 1912	Nias Is.
sardonyx Fruhstorfer, 1914	Sumatra, Malaya, Banka, Sarawak.
fruhstorferi Corbet, 1941	Java.
akronyx subsp. nov.	Lombok, Sambawa.
moltrechti Matsumura, 1919	Formosa, Hong Kong.
syn. *asakurai* Nire, 1920	
H. syrinx sikkima Moore, 1883	N. India, E. Pakistan, N. Burma.
moulmeina Moore, 1883	S. Burma, S. Thailand.
artontes Fruhstorfer, 1912	Nias Is.
maenala (Hewitson, 1869)	Sumatra, Malaya, Banka, Sarawak, Kalimantan, Sabah.
synn. & ff. :	
halba Distant, 1886	
affinis H. H. Druce, 1895	
corniculum H. H. Druce, 1895	
onychina (Staudinger, 1889)	Java.
syn. *holothura* Swinhoe, 1894	
privigna Fruhstorfer, 1897	Bali, Lombok.
decolor (Staudinger, 1889)	Palawan.
joloana Fruhstorfer, 1912	Jolo Is.
paulla Fruhstorfer, 1912	Bazilan Is.
camiguina Semper, 1890	Camiguin Is., Mindanao.
permagna Fruhstorfer, 1912	Sulawesi.
samoena Grose Smith, 1895	Batchian Is.
syrinx (C. Felder, 1860)	Amboina, Ceram.
schoutensis Joicey & Talbot, 1916	N.W. Irian—Papua.
H. albimacula viola Moore, 1882	Ceylon, India, E. Pakistan, Burma.
albimacula (Wood-Mason & de Nicéville, 1881)	Andaman Is.
malaya Corbet, 1941	Malaya.
anara Fruhstorfer, 1898	Java.
violetta subsp. nov.	Bali.
bellula Fruhstorfer, 1897	Sambawa.
chalcedonyx Fruhstorfer, 1914	Kalimantan (west coast).
syn. *onyxitis* Fruhstorfer, 1914	
albistigmata Moulton, 1912	Sarawak.
anytus (Staudinger, 1889)	Palawan.
taweya subsp. nov.	Sulawesi (west coast).
bilineata Semper, 1890	Mindanao.

triumphalis Murayama & Sibatani, 1943	Formosa.
H. amethysta purpurescens Corbet, 1941	S. Burma, Malaya.
isna Corbet, 1941	Nias Is.
overdijkinki Corbet, 1941	Java.
amethysta H. H. Druce, 1902	Sarawak, Sabah.
H. ciniata (? syn. *amethysta*) *ciniata* (Hewitson, 1863)	Batchian Is.
H. selina Grose Smith, 1895	West Sulawesi.
H. lefebvrei osma Fruhstorfer, 1912	Mindanao.
syn. *melera* Seitz, 1926	
osmana subsp. nov.	Mindoro.
lefebvrei (C. & R. Felder, 1862)	Luzon.
♂ f. *cuzneri* (Schultze, 1907)	
H. rarasana Sonan, 1936	Formosa.

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INDEX

Indexed below are the text references to the taxa only.

Synonyms in italics.

achaja, 108, 114
affinis, 120, 137
akara, 108
*akronyx, 118, 137
albimacula, 107, 112, 113, 126, 127, 137
albistigmata, 129, 137
amethysta, 112, 113, 130, 132, 139
*amor, 107, 109, 136
anara, 128, 137
andamana, 108
anytus, 129, 137
araotina, 108
*arta, 115, 137
*artontes, 119, 137
asakurai, 118, 137

bellula, 128, 137
bilineata, 130, 137

camiguina, 123, 137
celebica, 108
chalcedonyx, 128, 137
cingalensis, 114, 137
ciniata, 123, 124, 132, 138

corniculum, 120, 137
Cupido, 109, 136
cuzneri, 138

decolor, 122, 137

*fruhstorferi, 117, 137

**halba*, 120, 137
himeros, 108
holothura, 121, 137
Horaga, 110

inari, 108
*isna, 131, 138

joloana, 122, 137

lefebvrei, 113, 134, 135, 138

*maenala, 120, 137
malaya, 128, 137
melera, 135, 138
moltrechti, 118, 137
moulmeina, 119, 137

onychina, 121, 137
*onyx, 107, 112, 113, 114, 115, 137
onyxitis, 128, 137
osma, 135, 138
*osmana, 136, 138
overdijkinki, 132, 138

paulla, 122, 137
permagna, 124, 137
privigna, 122, 137
purpurescens, 131, 138

rana, 116, 137
*rarasana, 113, 136, 138
Rathinda, 109

samoena, 124, 132, 133, 137
*sardonyx, 116, 137
*schoutensis, 126, 137
*selina, 112, 113, 134, 138
sikkima, 119, 137
syrinx, 112, 113, 118, 125, 137

*taweya, 129, 137
triopas, 109, 136
triumphalis, 130, 138

viola, 107, 127, 137
*violetta, 128, 137

zuniga, 116, 137

* Asterisked are the taxa illustrated on Plate 1.

PLATE 1

Upper and undersides of left pair of wings of ♂ specimens of *Rathinda* and *Horaga*.

FIG. 1. *Horaga onyx onyx* f. *arta* Fruhstorfer (dry season form). Imphal, 13 March 1912.

FIG. 2. *H. onyx onyx* f. *onyx* (Moore) (normal wet season form). Imphal, 18 July 1911. Gen. Prep. NHB.1965/2506.

FIG. 3. **H. onyx sardonyx* Fruhstorfer, Singapore, 25 April 1953. Gen. Prep. NHB.1965/2527.

FIG. 4. **H. onyx fruhstorferi* Corbet, Holotype. Java. Gen. Prep. ASC Horaga 18a.

FIG. 5. **H. onyx akronyx* subsp. nov. Holotype. Sambawa, Sep. 1891. (right pair of wings reversed). Gen. Prep. NHB.1965/2503.

FIG. 6. *H. syrinx maenala* (Hewitson) f. *maenala*. Singapore, Jan. 1938.

FIG. 7. **H. syrinx artontes* Fruhstorfer, Holotype. Nias.

FIG. 8. **H. syrinx schoutensis* Joicey & Talbot, Mefor Is., N.W. New Guinea, Aug. 1920.

FIG. 9. *H. syrinx maenala* f. *halba* Distant, Singapore, 11 Dec. 1936.

FIG. 10. *Rathinda amor* (Fabricius) Hosur, near Bangalore, S. India.

FIG. 11. **H. albimacula taweya* subsp. nov. Holotype. W. Celebes, Aug. 1896. Gen. Prep. NHB.1965/2471.

FIG. 12. **H. albimacula violetta* subsp. nov. Holotype. Bali, April 1896. Gen. Prep. NHB.1965/2502 (see Pl. 2, fig. 20).

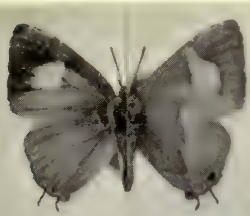
FIG. 13. **H. amethysta isna* Corbet, Holotype. Nias. Gen. Prep. NHB.1965/2501 (see Pl. 3, fig. 22).

FIG. 14. **H. selina* Grose Smith, Holotype. W. Celebes, Aug. 1891.

FIG. 15. **H. lefebvrei osmana* subsp. nov. Holotype. Mindoro. Gen. Prep. NHB.1965/2462.

FIG. 16. *H. rarasana* Sonan. Mt. Rara, Formosa, July 1964.

* Subspecies or species illustrated for the first time.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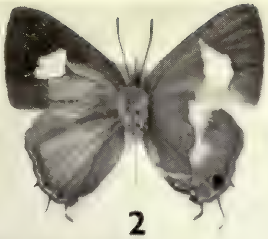
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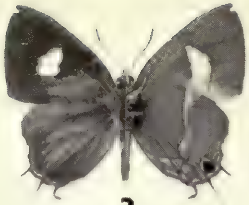
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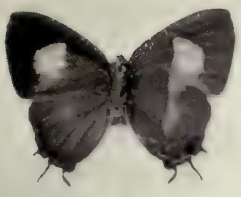
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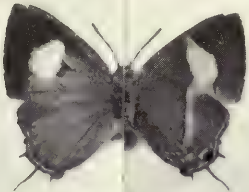
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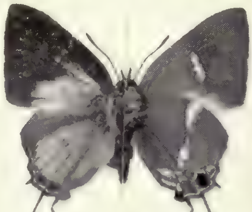
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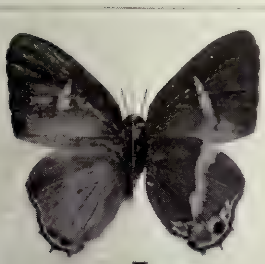
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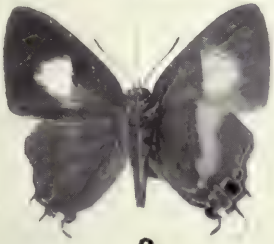
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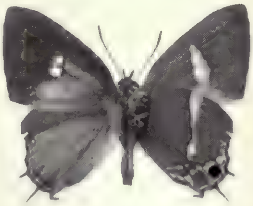
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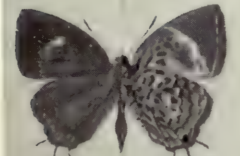
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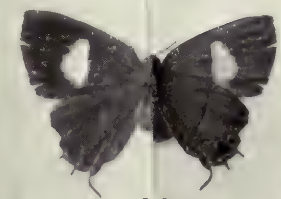
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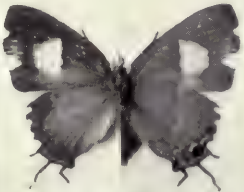
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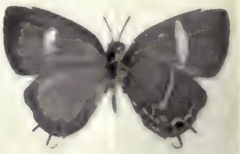
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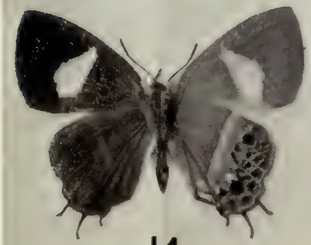
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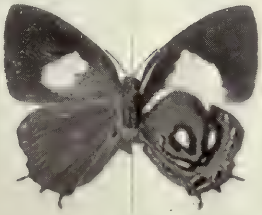
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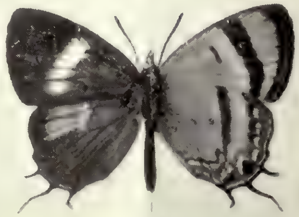
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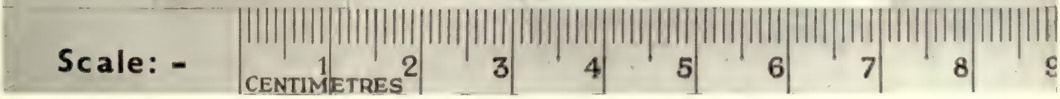
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CENTIMETRES

PLATE 2

♂ genitalia of *Rathinda* and *Horaga*

In all cases except Fig. 17, the left valva has been removed and the lateral aspect from the left is shown. Scale, see Pl. 3.

FIG. 17. *Rathinda amor* (Fabricius). (a) Genitalia complete, left lateral aspect. (b) Stereo Pair of the ventral aspect, with the aedeagus and both valvae removed, designed to show, so focused on, the brachia ; the anal tube is just visible. Separation of Pair, 1·5 mm.

Note in all three photographs the extreme length of the brachia or falces, causing the tips to be recurved (one of them is visible in Fig. 17a). Note also the central spine on each brachium.

Specimens ; (a) Orissa, Nov. 1913. (b) Ceylon.

Gen. Preps. ; (a) NHB. 1955/1554. (b) NHB. 1965/2508.

FIG. 18. *Horaga onyx* (Moore). Note the stout aedeagus (in this case with vesica everted), and angled valva (in this example showing the median tooth).

Specimen ; *H. onyx sardonyx* Fruhstorfer, Banka Is.

Gen. Prep. NHB. 1965/2489.

FIG. 19. *Horaga syrinx* (Felder). Note the longer, slimmer, aedeagus and the curved valva. This specimen has the least curved valva of all *syrinx* examined ; normally the arc is a full 90°.

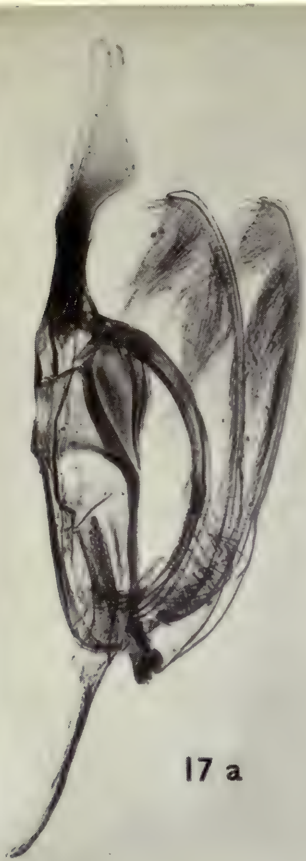
Specimen ; *H. syrinx paulla* Fruhstorfer, Holotype. Bazilan, Feb. 1898.

Gen. Prep. NHB. 1965/2517.

FIG. 20. *Horaga albimacula* (Wood-Mason & Nicéville). Note the much greater size though the insect is smaller. Constant from India to Formosa, the Philippines and Sambawa.

Specimen ; *H. albimacula violetta* subsp. nov. Bali, Apr. 1896.

Gen. Prep. NHB. 1965/2502 (specimen figured on Pl. 1, Fig. 12.)



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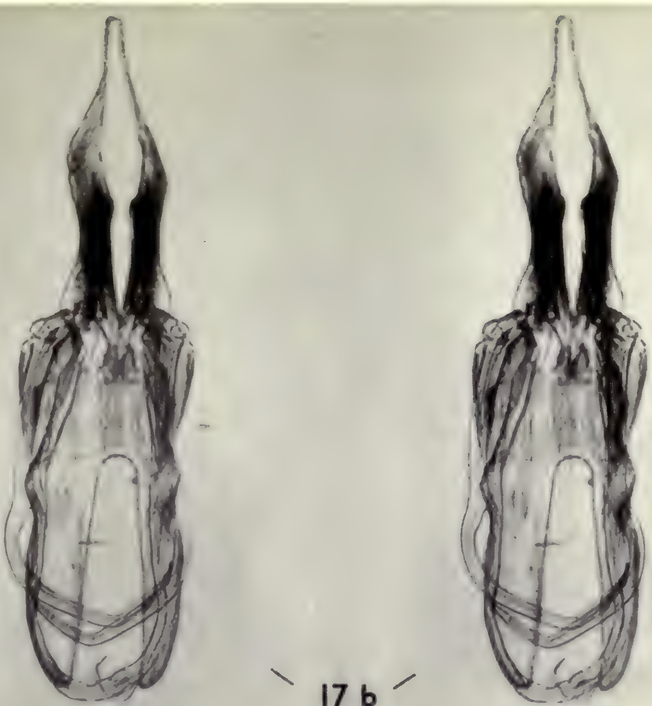

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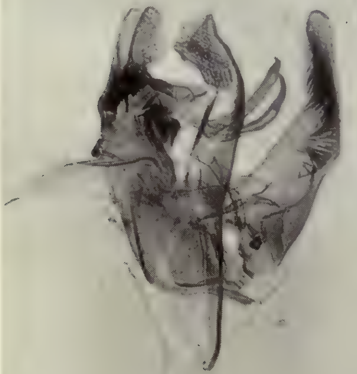
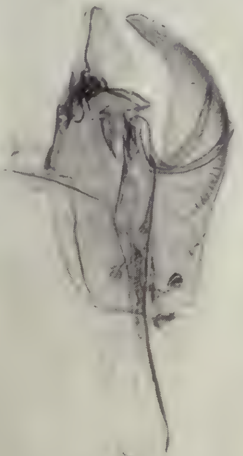


18



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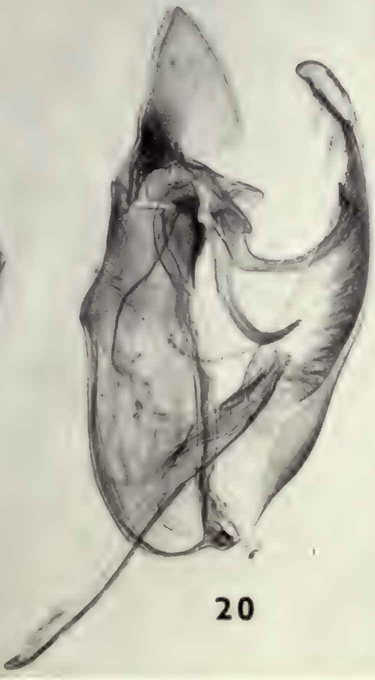

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PLATE 3

♂ genitalia of *Horaga*

In all cases the left valva has been removed and the lateral
aspect from the left is shown.

FIG. 21. *Horaga rarasana* Sonan. Note remarkable similarity in form to the three preceding species.

Specimen ; Mt. Rara, Formosa. July 1964.

Gen. Prep. NHB. 1965/2509.

FIG. 22. *Horaga amethysta* Druce. Note the very elongate vinculum and valva, tiny aedeagus, and peculiar brachia ; the terminal bowl of the right brachium, here seen end-on, masks its own stem and the pointed tip of the left brachium, the stem of which is clearly seen. A monstrous appendage for such a small insect.

Specimen ; *H. amethysta isna* Corbet, Holotype, Nias, 1895. (specimen figured on Pl. 1, Fig. 13).

Gen. Prep. NHB. 1965/2501.

FIG. 23. *Horaga selina* Grose Smith. The long simple left brachium is seen lying below (anterior to) the bifid right brachium, which is furnished with a basal " handle " ; the curved tip of the left brachium appears between the arms of the right.

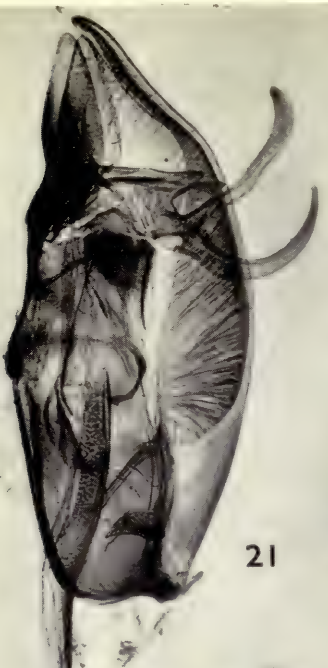
Specimen ; Taweya, Celebes west coast ; Aug. 1896.

Gen. Prep. NHB. 1965/2511.

FIG. 24. *Horaga lefebvrei* (Felder). The simple, curved left brachium contrasts with the right which has 3 sections ; a robust curved and pointed basal third, a broad thin central blade here seen passing behind and over the left, and a sharp twirled tip here seen end-on and holding the aedeagus.

Specimen ; *H. lefebvrei osmana* subsp. nov. Paratype ; Mindoro.

Gen. Prep. NHB. 1965/2467.



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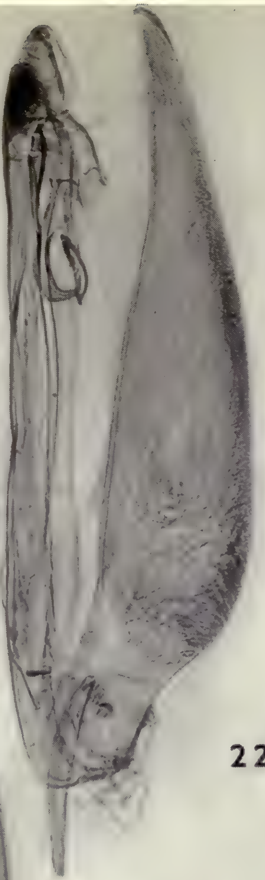

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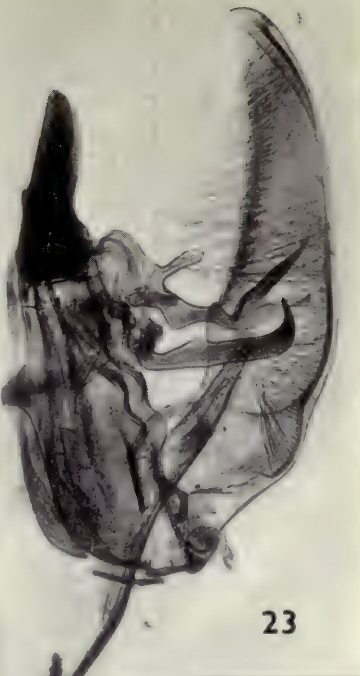

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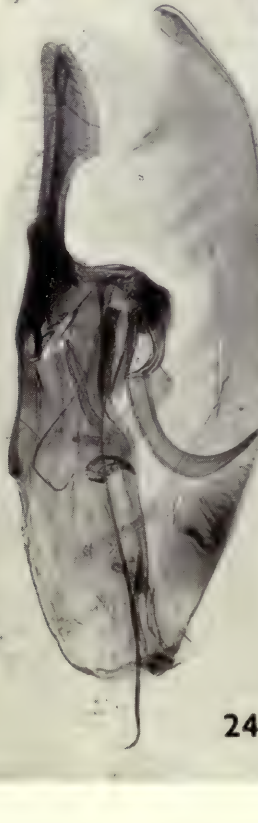

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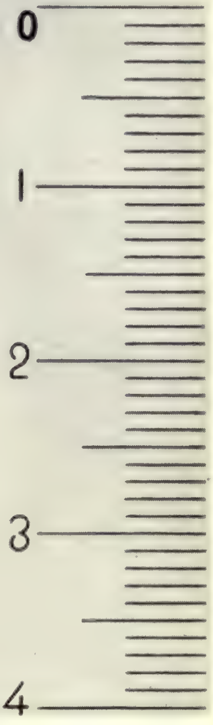

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THE GENUS *RHIPIDOCEPHALA* (DIPTERA : ASILIDAE)

H. OLDROYD

BULLETIN OF
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ENTOMOLOGY Vol. 18 No. 5
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British Museum (Natural History)

Pp. 143–172 ; 38 *Text-figures*

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TRUSTEES OF
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THE GENUS *RHIPIDOCEPHALA* (DIPTERA : ASILIDAE)

By H. OLDROYD

SYNOPSIS

Rhipidocephala Hermann and *Holcocephala* Jaennicke are two genera of Asilidae that have been recorded from both the Neotropical and the Ethiopian Regions. The differences between the two genera are discussed and redefined, and reasons are given for the view that the Ethiopian species belong to *Rhipidocephala* and the Neotropical species to *Holcocephala*. A wide view of the genus *Rhipidocephala* is advocated, discounting differences of antennal structure, and incorporating *Paroxynoton* Janssens and *Margaritola* Hull as synonyms. Twenty-four species are described, sixteen of them new, with a key to species, and figures of male and female genitalia.

In my key to the tribes and genera of African Asilidae (Oldroyd, 1963 : 7) I divided the genera of the tribe Xenomyzini into two groups, with a constant difference in wing-venation, but also differing in general appearance. The first group comprised the six genera *Oxynoton, Margaritola, Holcocephala, Oligopogon, Rhipidocephala* and *Paroxynoton*. *Oligopogon* stands apart from the rest, in body-shape, and in the possession of acanthophorites in the female, and requires a separate study. The other five genera are tiny, dark flies with broad, dark wings. *Oxynoton* Janssens, 1951 has a very distinctive, hump-backed development of the thorax, but the separation of the other four is based chiefly upon characters of the antennae, and is much less clear.

Understanding of the four genera, and of related forms in other regions, depends upon a clear assessment of *Holcocephala* and *Rhipidocephala*. These were both defined by Hermann (1926 : 154), who separated them in his key as follows :

Apical style one-segmented, drawn out into a point; moustache shrunk to mouth-margin; mesonotum bare, or sometimes with scattered soft hairs . . . . . . **HOLCOCEPHALA** Jaennicke

Apical style two-segmented, with a brush of hairs at tip; moustache reaching almost to bases of antennae ; mesonotum thickly covered with long, erect hairs . . . **RHIPIDOCEPHALA** Hermann

This gave the impression that antennal structure was the key to the separation of these two genera, a lead that was followed by Hull (1962 : 52) and by Oldroyd (1963 : 7). Hull's description of *Holcocephala* refers to " a characteristic, shallow, transverse groove, lying a short distance above the epistoma, which is absent from such Old World genera . . . as *Rhipidocephala* ", and study of Hermann's generic descriptions shows that *Rhipidocephala* was not, in fact, distinguished from *Holcocephala* upon antennal characters, but by details of the facial structure.

Text-figs. 2, 3 illustrate this difference, which is quite definite. In *Holcocephala* the frons and face are deeply recessed, exaggerating the " Goggle-eyed " aspect proper to the tribe Xenomyzini, and the face has a transverse groove which cuts off a distinct epistomal ridge, to which the moustache is confined. The hairs of the moustache are few and bristly, and the median swelling of the face has only fine hairs. In *Rhipidocephala* (Text-fig. 2) the head is less withdrawn between the eyes, the ocellar tubercle is huge and prominent, and in particular there is no transverse groove across the face. The moustache often, though not always, extends over much

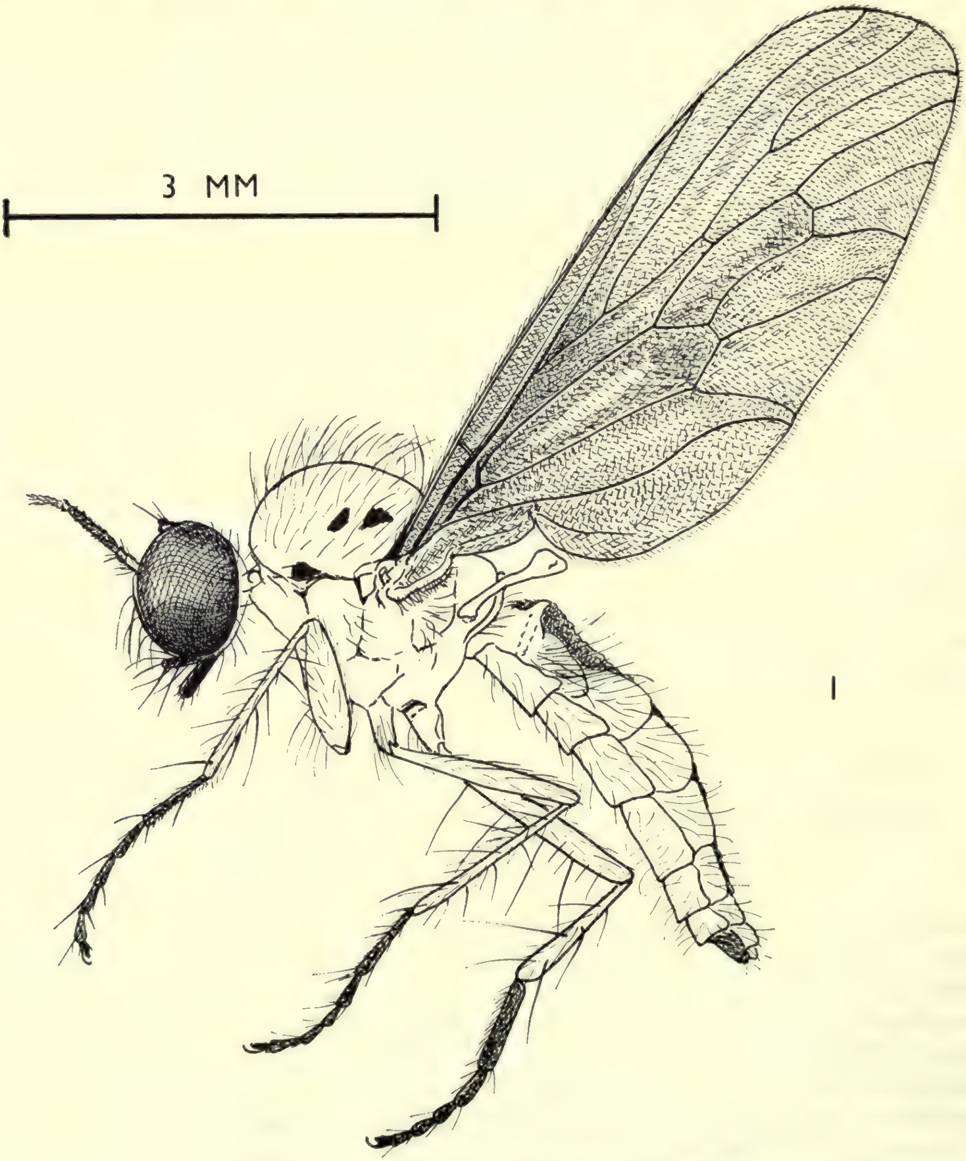
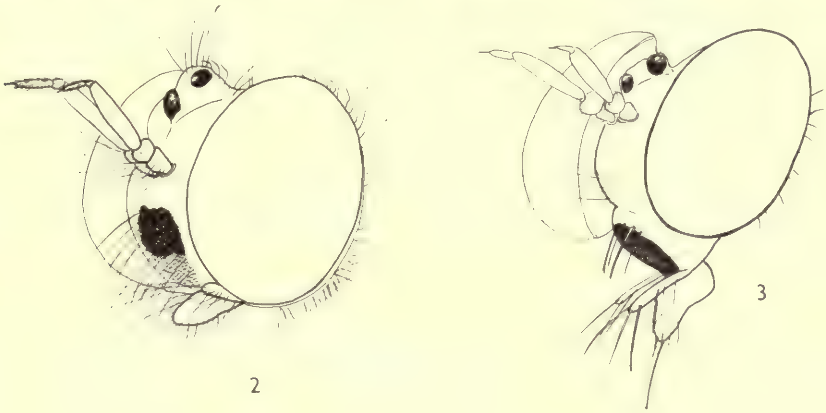


Fig. 1. *Rhipidocephala semitestacea* (Loew) ♀.

of the facial lobe, and this area is always darker than its surroundings, and in most species bears a bare, shining spot. Moreover, *Holcocephala* has the palpi relatively long and slender, the proboscis stout and awl-shaped ; *Rhipidocephala* has smaller, inconspicuous palpi and proboscis.

The antennae of *Holcocephala* show a high degree of constancy, with a conical style and an apical spine. Within the scope of *Rhipidocephala*, as now defined, there is much greater variation in antennal structure, and the question arises whether or not the genus should be still further divided, or whether the variations should be regarded as of specific value only. If the latter view is taken, then it is clear that *Margaritola* Hull and *Paroxynoton* Janssens must also be merged with *Rhipidocephala*.

Among the African species examined during the present study, four types of antennal structure can be recognized (Text-fig. 4, A–D). Species can be fairly clearly assigned to one or other of these types, though not without variation. Now Hermann (1926 : 175) says that the genitalia of all the *Rhipidocephala* known to him are yellow in colour, and that the ovipositor is conical, and divided into two lobes. This is so in several species, but it is by no means universal in the genus. Text-figs. 6–38 show some of the variants : many ovipositors are partly or wholly concealed ; and whether exposed or concealed, some are yellow, some black, some bilobed, some not. Moreover there is no correlation between the type of ovipositor and the type of antenna.



FIGS. 2, 3. Heads of : 2, *Rhipidocephala* ; 3, *Holcocephala*. Showing generic differences in frons, face and palpi ; for antennae see text.

It seems, therefore, that there is no good reason for subdividing *Rhipidocephala* on the basis of either antennal or genital structure, and that one should retain the clearly-defined genus indicated by the head-structure as shown in Text-fig. 2, reducing *Margaritola* Hull and *Paroxynoton* Janssens to synonymy.

When defining *Rhipidocephala*, Hermann (1926 : 174) stated that it comprised the African species previously assigned to *Holcocephala*, as well as two species from the Neotropical Region : *analis* (Macquart), and *flavipes* Hermann.

The case of *analis* is rather complicated. Macquart (1846 : 69–70) based his *Discocephala analis* upon three specimens from Colombia, and one " exactly similar " from Port Natal in Africa. The specific description says that the wing-venation is the same as in *Discocephala rufiventris*, a synonym of *Dasypogon abdominalis* (Say, 1823), and undoubtedly a *Holcocephala* from the figures of wing and head given by Macquart. It seems, therefore, that the true *analis* Macquart is a Neotropical species of *Holcocephala.*

Hermann (1926 : 176) clearly based his account of *Rhipidocephala* on African species, and stated that the genus comprised the African species previously assigned to *Holcocephala*. The only evidence of any Neotropical species lay in two items : the above statement by Macquart about *analis* ; and the presence of Vienna in two species of *Rhipidocephala* in the von Winthem collection, one labelled Mexico, the other without locality, but presumed by Hermann to be from the same area. Hermann regarded the latter, without locality, as being probably *analis* Macquart, and made it the type-species of *Rhipidocephala*. The von Winthem specimen labelled " Mexico " he described as a new species, *R. flavipes* Hermann.

Through the kindness of Prof. Max Beier I have been able to examine this von Winthem material, and several points emerge. Firstly that the specimen labelled " *analis* " cannot be the *analis* of Macquart because its venation is not the same as that of *Holcocephala rufiventris* (Macquart). Therefore the type-species of *Rhipidocephala* must be :

Rhipidocephala analis Macquart ; Hermann = *angustior* Oldroyd, sp. n. (see below).

Under Art. 70(a) of the International Code of Zoological Nomenclature, this case of a misidentified type-species must be referred to the Commission, requesting a use of the Plenary Powers in support of choice number (1) : the nominal species actually involved, which was wrongly named in the type-designation.

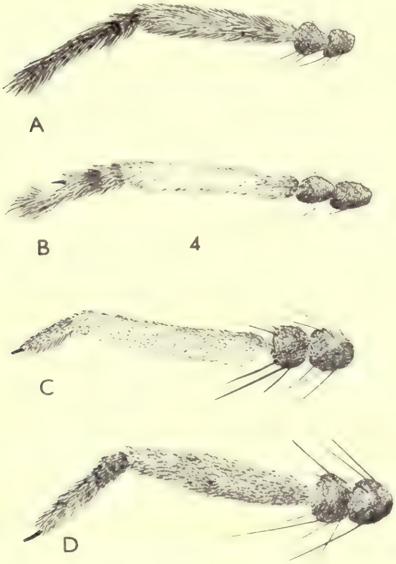
Before such a case can be made out for submission to the Commission, it will be necessary to study not only the Neotropical but also the Oriental species involved in this complex of genera.

The specimen in Vienna bears several labels, written and printed, but the word " Mexico " appears only on a small *printed* label, apparently added at some later date.

There is thus no evidence of any *Rhipidocephala* from S. America, and none of any *Holcocephala* from Africa. Any distinction based upon antennal structure, such as the one in my key (Oldroyd, 1963 : 7) should be abandoned, and the genus *Rhipidocephala* based upon the structure of the head. In this respect, and in the closed anal cell, *Seabramyia* Carrera, 1958, is a variant of *Holcocephala* and not of *Rhipidocephala.*

As thus defined, *Rhipidocephala* takes in all the mainland species that have been described in the genera *Rhipidocephala*, *Holcocephala*, *Paroxynoton* and *Margaritola.* From Madagascar, *Holcocephala lambertoni* Bromley is a normal *Rhipidocephala*, but *Rhipidocephala hyalipennis* Oldroyd, 1959, is an *Oligopogon.*

It is a pity that the type-species selected by Hermann—*angustior* sp. n. (*analis* Macquart ; Hermann)—belongs to a small group of species that differ in some respect from the majority of *Rhipidocephala*. They have no bare spot on the face, the abdomen dorsally is not membranous to the extent shown in Text-fig. 5, and the ovipositor is unusually long and stout (Text-figs. 32, 38). None of these characters is constant. In particular, the dorsum of the abdomen shows varying degrees of membranous development, and may have no more than a well-developed cleft between segments one and two.



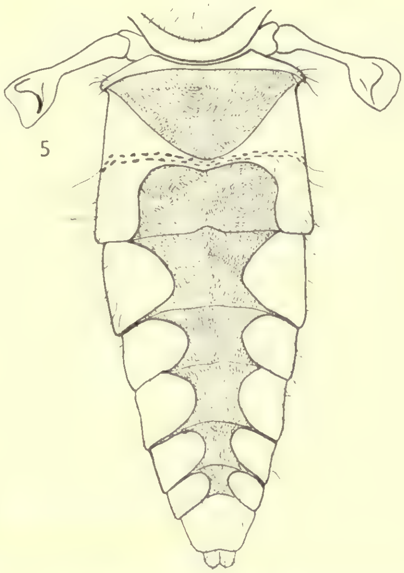


FIG. 4. Range of antennal structure within the genus *Rhipidocephala*, with examples of four principal types : A–D.

FIG. 5. *Rhipidocephala morio* Hermann. Dorsum of abdomen, showing extent of membranous area.

RHIPIDOCEPHALA Hermann, 1926

Rhipidocephala Hermann, 1926, *Verh. zool.-bot. Ges. Wien* **74** (**1924/25**) : 174 ; Oldroyd, 1959, *Mém. Inst. scient. Madagascar* (E) **11** : 276 ; Hull, 1962, *Robber Flies of the World* : 64.

Type-species : *Rhipidocephala angustior* Oldroyd, sp. n., for *analis* Macquart ; Hermann, by original designation.

Paroxynoton Janssens, 1953, *Bull. Inst. r. Sci. nat. Belg.* **29** : 11, **syn. n.**

Type-species : *Paroxynoton tigrinum* Janssens, 1953, by original designation.

Margaritola Hull, 1958, *Proc. ent. Soc. Wash.* **60** : 255, **syn. n.**

Type-species : *Margaritola mirabilis* Hull, 1958, by original designation.

Head. As shown in Text-fig. 2, only slightly recessed at vertex, but with a very large and prominent ocellar tubercle. Face smoothly rounded, not deeply recessed along eye-margins, and without transverse groove delineating epistoma (cf. *Holcocephala,* Text-fig. 3). Moustache consisting of scattered, relatively fine, bristly hairs, except in a few species, where they are darker and stronger ; these hairs often extending over lower four-fifths of face, though sometimes reduced to vicinity of epistoma. Frons and face covered with tomentum, often darker on frons, but sometimes unicolorous ; most species have an ovoid area that is bare, shining and usually black, lying either dorsal to moustache, or with part of moustache growing from it. Palpi and proboscis relatively shorter than those of *Holcocephala,* and inconspicuous, though palpi have long and rather stiff bristles.

The antennae, a feature of special interest in this genus, have already been discussed. They are less constant in form than those of *Holcocephala,* and cover the four types shown in Text-fig. 4, but with intermediates. Generally the second of the microsegments has long pile.

Thorax moderately convex, though slightly rounded in one or two species, never with an acute angle as in *Oxynoton francoisi* Janssens. Mesonotum normally heavily covered with tomentum, rarely with small bare spots (Text-fig. 1) or shining through thin tomentum ; normally grey with a dark brown pattern, consisting of a median stripe, broad and even divided anteriorly, but tapering strongly posteriorly, flanked by two lateral spots. Small modifications of this pattern are very constant, and make useful recognition features in practice, though difficult to define in a key to species. Most species have long, erect, curved hairs, especially posteriorly and on scutellum, which has no distinct marginal bristles. Pleura undistinguished, with a few hairs on mesopleuron, and with a row of stronger ones before halteres.

Abdomen remarkable for excavation of the dorsum into a membranous trough (Text-fig. 5). Second tergite retains a narrow bridge across its middle, but otherwise tergites as far back as seventh segment are broken into two widely separated sclerites. This membranous area of abdomen seems to be confined to the two genera *Holcocephala* and *Rhipidocephala,* as here defined. It is not always so fully developed, and in one or two species is restricted to first segment, or first two ; sometimes indicated merely by wrinkling of dorsal surface.

Genitalia of both sexes show good specific differences, with a wide range of shape and relative size (Text-figs. 6–38).

Legs unremarkable, without swellings or special structures, but—with some variation—their colour is of use in distinguishing species ; covered with short hairs and long, slender bristles, all of which are normally pale yellow.

Wings (Text-fig 1) relatively broad, often expanded basally by broadening of costal and axillary cells. Venation simple, primitive ; anal cell open or closed just before margin [closed and stalked in *Holcocephala*], all other cells open on wing-margin.

Size rather constant at about 5–6 mm., both for body-length and for length of one wing.

Key to Species

1 Face with a shining, bare spot, usually black (Text-fig. 2). Frons with few or no hairs laterally, along eye-margins. Abdomen extensively membranous dorsally (Text-fig. 5) 2

– Face entirely tomented, without any bare spot. Frons with long hairs laterally, along eye-margins. Abdomen with membranous areas usually incompletely developed, or confined to first two segments 19

2 Mesonotum without well-developed bare spots, though tomentum may be thin all over, and then mesonotum appears rather shining, black 3

– Mesonotum covered with bronze tomentum, which leaves bare and shining black the humeri and two well-defined, round spots on each side. (Text-fig. 1)
semitestacea (Loew) (**punctulata** Wulp) (p. 152)

3 Mesonotum without the distinctive long, curved hairs, though a uniform covering of short hairs may be present 4

– Mesonotum and scutellum with long, curved hairs, at least posteriorly, conspicuous in side view 6

4 Legs and abdomen reddish yellow. Mesonotum shining black through thin layer of bronze tomentum, and with short yellow hairs. Moustache includes bare area of face . . . . ***mirabilis*** (Hull) (p. 153)

– Legs and abdomen entirely black or ashy grey. Mesonotum not at all shining black. Moustache confined to mouth-margin, and arising from tomentum; bare area of face lies dorsal to moustache. 5

5 Mesonotum humped, with chocolate-brown tomentum ; darker stripes hardly visible . . . . ***obscurata*** sp. n. (p. 154)

– Mesonotum not unusually humped, grey posteriorly, with 3 distinct black stripes anteriorly . . . . ***divestita*** sp. n. (p. 156)

6 Legs conspicuously reddish yellow, at least in part 7

– Legs entirely black, except narrowly at knees 13

7 Femora uniformly black, contrasting strongly with reddish bases of tibiae. . . 8

– Femora partly or wholly reddish 9

8 Postscutellum grey, concolorous with mesonotum. . ***tigrina*** (Janssens) (p. 156)

– Postscutellum brown, contrasting with mesonotum . . ***inconspicua*** sp. n. (p. 157)

9 Mesonotal pattern unique ; the 3 stripes reduced to a transverse row of three brown spots, and mesonotum entirely grey both anteriorly and posteriorly ***distincta*** sp. n. (p. 157)

– Mesonotum not so patterned 10

10 Mesonotum yellow-grey, with short median stripe and a conspicuous brown triangular spot on each side before the suture. Hind femora almost entirely reddish yellow ***fulva*** sp. n. (p. 158)

— Mesonotum dull brown with indistinct stripes. Hind femora reddish yellow, or black with yellow tips 11

11 Hind femora entirely reddish yellow ; fore and middle femora black with yellow tips ***flavipes*** Hermann (p. 159)

— All femora black with yellow tips 12

12 Mesonotum densely hairy, and mostly dull brown, stripes extending from front to rear ***umbripennis*** (Loew) (p. 159)

— Mesonotum sparsely hairy, and stripes short . . ***tenera*** sp. n. (p. 161)

13 Mesonotum almost uniformly ashy grey, with only a faint trace of the 3 darker stripes ***zumpti*** sp. n. (p. 161)

— Mesonotum not uniformly ashy grey 14

14 Mesonotum dull black-brown, without any definite pattern, or with only indistinct stripes, and not noticeably more grey either anteriorly or posteriorly . . . 15

— Mesonotum with 3 distinct brown stripes, sometimes entirely grey either anteriorly or posteriorly 16

15 Antennae at least as long as head, microsegments relatively long ; second microsegment with a dorsal spine, but with only a short pile. Mesonotum not strongly convex, little higher than vertex . . . . . ***caffra*** (Macquart) (p. 162)

— Antennae not longer than head, third segment relatively short; second microsgment with no dorsal spine, but with long hairs. Mesonotum strongly convex, extending well above vertex, and with long hairs posteriorly. . . ***morio*** (Hermann) (p. 163)

16 Thoracic stripes extending from anterior margin of mesonotum almost to posterior margin 17

— Thoracic stripes shorter, leaving either anterior or posterior third of mesonotum grey 18

17 Moustache black. Mesonotum with a pair of parallel median stripes, replaced posteriorly by a single stripe just before scutellum. Mesopleuron wholly yellowish brown, forming a band from fore coxae to humeri . . ***signata*** (Hermann) (p. 163)

— Moustache pale yellowish. Mesonotum with a heavily marked, solid, median stripe, narrowing and disappearing posteriorly, with no median prescutellar stripe. Mesopleuron mainly grey, brown only dorsally . . ***congoiensis*** sp. n. (p. 164)

18 Mesonotum conspicuously marked, with three brown stripes coalescing in anterior half; posterior half entirely grey with long, yellowish hairs: scutellum grey. Genitalia black . . . . ***scutata*** sp. n. (p. 166)

— Mesonotum grey anteriorly ; posteriorly, brown stripes show rather indistinctly; scutellum brown. Genitalia reddish yellow, conspicuous. . . ***engeli*** sp. n. (p. 166)

19 Costal margin of wing expanded by broadening of costal cell 20

— Costal margin of wing not expanded ; costal cell narrow 23

20 Sides of abdomen with recumbent yellow hairs. Female with a conspicuous, shining ovipositor (Text-fig. 32) . . . . ***fimbriata*** sp. n. (p. 167)

— Sides of abdomen without conspicuous, yellow hairs. Female with normal, inconspicuous ovipositor 21

21 Ashy grey and brown species. Head with grey tomentum and long, brown hairs on frons, antennae, moustache and occiput. Thorax with grey and brown tomentum and long, brown hairs, especially in mesopleural and metapleural tufts ***manicata*** sp. n. (p. 167)

— Black-brown species with hairs pale yellowish or white. Frons chocolate-brown, contrasting with yellowish grey face. Hairs all pale. Mesopleural and metapleural tufts also pale 22

22 Tibiae orange with black tips. Hairs of body, especially those of mesopleuron, yellow . . . . ***speciosa*** sp. n. (p. 168)

— Legs all black. Hairs of body whitish, those of mesopleuron silvery ***doornensis*** sp. n. (p. 169)

23 Slender species, with legs entirely black ***quadrifaria*** Hermann (p. 169)

— Robust species, with tibiae and tarsi bright orange ***angustior*** sp. n. (p. 170)

Rhipidocephala semitestacea (Loew)

Discocephala semitestacea Loew, 1863, *Wien. ent. Monat.* **7** : 11.
Rhipidocephala semitestacea (Loew) Hermann, 1926, *Verh. zool-bot. Ges. Wien* **7** : 178.
Holcocephala punctulata Wulp, 1899, *Trans. ent. Soc. Lond.* **1899** : 88, **syn. n.**

Loew's paper of 1863 described specimens collected by C. Tollin at Bloemfontein. The types are not in Vienna, and Horn's list states that the Tollin material was scattered. Some of it may be in the v. Roeder collection in Halle.

Loew's original description of *semitesatcea* is short :

♂ Fusca, fusco-pollinosa, opaca, thorace non vittato, abdomine pedibusque testaceis, tarsis apicem versus fuscis, alis nigris ; antennae nigrae, stylo terminali breviusculo, in apice pilis minutis nigris penicillato ; mystace pilisque palporum nigrorum dilute subfuscis : long corp. 2 lin. ; long. al. 2¼ lin.

Obs. Stylus antennarum penicillatus ut in Oligopogonibus, sed reliqua omnia ut in Discocephalis genuinis, a quibus non separanda.

Hermann (1926 : 178) repeated the last observation, but had clearly not seen the type, nor was it among the *Rhipidocephala* lent to me from the Vienna Museum by Dr. Max Beier.

Specimens in the British Museum, determined by Engel, agree with the original description as far as it goes. These specimens are distinct in having the black mesonotum uniformly obscured by bright yellow tomentum, except for the humeri and for two small, round, bare, black spots on each side, exactly as in *punctulata* Wulp. The latter is authentically represented in the British Museum by specimens from Aden and Somaliland, and these are indistinguishable from the South African specimens, even in genitalia.

Thus, although the type localities of the two species are so far apart that their synonymy seems inherently improbable, it is not possible at the moment to find any difference between them.

♂ *Head.* Frons and face uniformly covered with dense yellow tomentum, except for large, bare, brownish area occupied by sparse yellow moustache. Antennae of type A (Text-fig. 4), black, first two segments with yellow tomentum and yellow hairs. Proboscis and palpi black-brown with yellow hairs. Occiput covered with yellowish grey tomentum and with yellow hairs along eye-margins.

Thorax. Mesonotum shining black in ground colour, normally with uniform covering of dense brassy yellow tomentum, except for humeri and two small, rounded spots on each side, which are bare, shining black, and very conspicuous (Text-fig. 1). Clothing hairs yellow, long and erect. Scutellum with brassy tomentum and yellow hairs. Pleura covered with greyish yellow tomentum, a little browner anteriorly ; hairs bristly yellow, confined to anterior area of mesonotum, and to metapleural tuft in front of halteres.

Abdomen entirely bright orange, with brassy tomentum and long, yellow hairs. Male genitalia as in Text-fig. 6. Tergites membranous as shown in Text-fig. 5, but being almost concolorous with sclerites, this area is not obvious in dried specimens.

Legs. Coxae like pleura ; femora and tibiae yellow-brown ; tarsi darker. Hairs and bristles yellow.

Wings uniformly dark brown. Halteres with large yellow knob.

Length of body 5 mm. ; of wing 4·5 mm.

♀ similar. Ovipositor compact, eighth tergite short, partly bare and shining, lamellae little prominent.

Holotype of *semitestacea* ? in Halle ; of *punctulata* in Hope Museum, Oxford.

Distribution. S.W. AFRICA : Okahandja, ii-iii.1928 (*R. E. Turner*) , Grootfontein, i.1920 (*R. W. Tucker*) ; Waterburg, ii.1920 (*R. W. Tucker*) ; Narebis, ii.1921 (*F. Barnard*). CAPE PROVINCE : Worcester, 17–31.viii.1928 (*R. E. Turner*).

TANGANYIKA : N.E. Kondoa, v.1955 (*J. F. Lamerton*)—this specimen forms a link between the above S. African localities and the following :

SOMALILAND : Bohotle, 1903 (*A. F. Appleton*). ADEN : 16.iii.95 (*C. G. Nurse*). Wulp's original type material of *punctulata*, from Aden, was collected by Col. Yerbury.

Rhipidocephala mirabilis (Hull)

Margaritola mirabilis Hull, 1958, *Proc. ent. Soc. Wash.* **60** : 255 ; 1962, *Robber Flies of the World* : 66, **comb. n.**

Though this species was made the type of a new genus, it clearly belongs in *Rhipidocephala*, as defined in the present paper. The antennae, of type A (Text-fig. 4) are not unique in the genus, and indeed the species is quite close to *semitestacea*. Some specimens of *semitestacea*, especially those with the thorax greasy, could easily be mistaken for *mirabilis*, and the single specimen of *mirabilis* in the British Museum collection was originally labelled *semitestacea* by Engel.

♀ *Head.* Frons and face with dense whitish tomentum, leaving a bare, shining black area round ocellar tubercle, and a large, ovate area occupied by moustache. Ocellar bristles, and those of sparse moustache, yellow. Antennae of type A (Text-fig. 4) black, with yellow hairs. Proboscis and palpi also black with yellow hairs. Occiput covered with grey tomentum, more densely white along eye-margins, and with short pale hairs.

Thorax. Mesonotum shining black, only narrowly tomented at extreme sides, on anterior face, and on flat prescutellar area; clothed with yellow hairs that are moderately dense, but uniformly shorter than those of *semitestacea*. Scutellum similar, i.e. shining black with yellow hairs and a narrowly tomented rim. Pleura with grey tomentum, browner on mesopleuron. Hairs fine, yellow, restricted to a patch on mesopleuron and a vertical row in front of halteres.

Abdomen entirely bright orange with yellow tomentum and short yellow hairs. Ovipositor short, shining eighth tergite and lamellae almost concealed (Text-fig. 8).

Legs. Coxae and trochanters black in ground colour, and tomented like pleura. Femora, tibiae and most of basitarsi orange; tips of basitarsi and other tarsomeres black. Hairs and bristles yellow.

Wings dark brown, becoming paler towards tip. Halteres large, orange.

Length of body 5 mm.; of wing 5 mm.

♂. Closely similar; genitalia as in Text-fig. 7.

Holotype in U.S. National Museum, Washington.

Distribution. Type locality is MOÇAMBIQUE: Lourenço Marques. In B.M. (N.H.) 1 ♀, S. RHODESIA: Sawmills, 12.iv.1920 (?collector). In South African Institute for Medical Research 4 ♂, 3 ♀, TRANSVAAL: Rootberg & Letalel (*F. Zumpt*).

Rhipidocephala obscurata **sp. n.**

One of a small number of species in which the usual clothing hairs of the mesonotum are lacking. In *obscurata* the stripes, too, are lacking, and the mesonotum is black-brown with lighter brown rim. It thus resembles *morio* Hermann in general coloration, but is distinguished by the absence of the mesonotal hairs, and by the genitalia.

♂ *Head.* Frons and face black-brown in ground colour, but entirely covered with brown tomentum except for the facial bare area. In this species the facial bare area is above the moustache, which is reduced to a few yellow bristles on the epistoma (cf. discussion of *Holcocephala*, above). Antennae, however, of *Rhipidocephala* type D (Text-fig. 4), black, basal segments with pale hairs. Proboscis and palpi black with yellow hairs. Occiput brown with white rim on eye-margin, and with short, fine, yellow hairs.

Thorax. Mesonotum entirely covered with dense tomentum, even over humeri; more blackish anteriorly, more brownish laterally and posteriorly. Hairs few and sparse, recumbent, and hardly visible in side view. Pleura similar, heavily tomented, more blackish on dorsal half, more greyish ventrally. Hairs yellow.

Abdomen. General colour ashy. Dark chocolate-brown at sides, more yellowish in membranous areas dorsally. Each segment with a large area of grey tomentum laterally, but first and most of second segments black-brown. ♂ genitalia as in Text-fig. 9, shining black-brown.

Legs black, with yellow clothing hairs and yellow bristles.

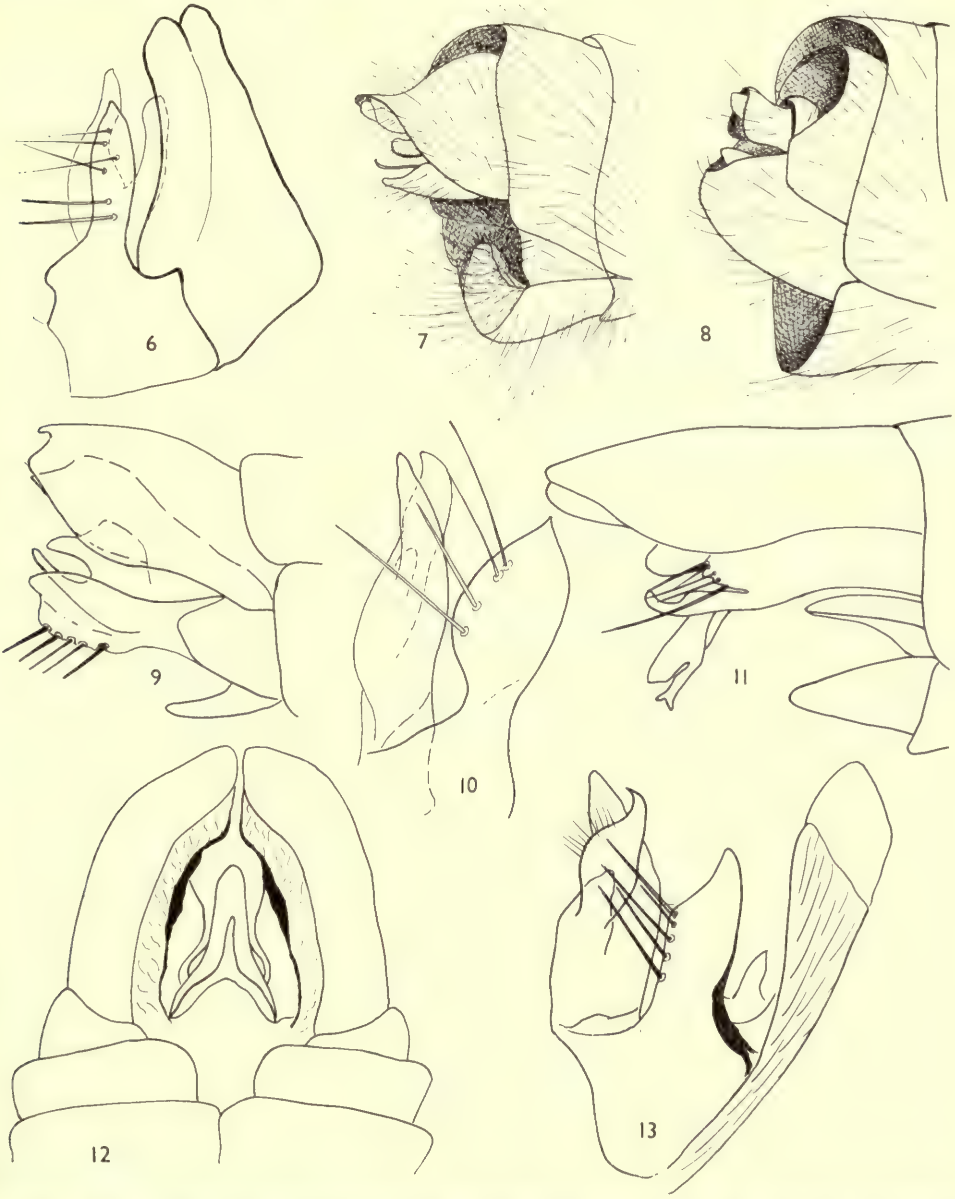
Wings uniformly black-brown. Halteres yellow.

Length of body 5 mm.; of wing 5 mm.

♀ closely similar. Eighth sternite is mostly shining, and forms a short, stout ovipositor.

Holotype ♂. S. RHODESIA: Chavavu area, 7 m. E. of Kariba, 6.ii.1956 (*R. Goodier*). In B.M. (N.H.).

Paratypes: S. Rhodesia: Kariba Area, Chavavu area, 6.ii.1956, 19.i.1956, 2 ♀; Kessesse R. area, 20.i.1956, 1 ♂, 1 ♀ (all *R. Goodier*).



Figs. 6–13. Genitalia of *Rhipidocephala*; those with a characteristic external appearance are drawn *in situ*, those requiring dissection are drawn from slide-mounts: 6, ***semitestacea*** ♂; 7, ***mirabilis*** ♂; 8, ***mirabilis*** ♀; 9, ***obscurata*** ♂; 10, ***divestita***, ♂; 11, 12, ***tigrina*** ♂; 13, ***inconspicua*** ♂.

Rhipidocephala divestita sp. n.

Another species with only insignificant bristles and hairs on the mesonotum, *divestita* is distinguished from *obscurata* sp. n. by the distinct dark pattern of the mesonotum and by the male genitalia.

♂ *Head*. Frons and face with yellowish white tomentum ; a brownish bar through bases of antennae, and ocellar tubercle with brown tomentum. Face has a small, transverse bare area lying dorsal to moustache, which is reduced to a few yellow bristles close to epistoma. Antennae of type D (Text-fig. 4) black, basal segments with yellow hairs. Proboscis and palpi black with yellow hairs. Occiput with white tomentum and white hairs.

Thorax. Mesonotum light grey, with a distinct black-brown pattern confined to anterior half ; a broad median stripe, divided anteriorly, tapering posteriorly, and on each side of it a triangular patch. Hairs reduced to a few posteriorly and on scutellum, which is uniformly grey. Pleura black on dorsal half, grey ventrally.

Abdomen ashy grey like that of *obscurata*. Only middle, membranous areas of tergites a little reddish. Base of each segment black-brown, but from third segment onwards with a pair of large, grey lateral spots on each segment. Hairs short, yellow. Genitalia as in Text-fig. 10.

Legs black-brown, with yellow hairs and bristles.

Wings black. Halteres orange.

Length of body 5 mm. ; of wing 5 mm.

♀ similar. Ovipositor as in *obscurata*, short, stout, with eighth segment shining through thin tomentum.

Holotype ♂. ZANZIBAR : Mazi Maja, x–xii. 1924 (*H. J. Snell*). In B.M. (N.H.).

Paratypes : ZANZIBAR : Mazi Maja, x–xii. 1924 (*H. J. Snell*), 1 ♂, 9 ♀.

Rhipidocephala tigrina (Janssens)

Paroxynoton tigrinum Janssens, 1953, *Bull. Inst. r. Sci. nat. Belg.* **29** : 12, **comb. n.**

This species was originally described as type of a new genus, *Paroxynoton*, by comparison with the same author's earlier genus *Oxynoton*. Both genera are represented in the British Museum collection, *P. tigrinum* by paratypes. The specimens show that, while *Oxynoton francoisi* Janssens is a very distinctive fly with a curiously hump-backed mesonotum, *P. tigrinum* falls well within the concept of *Rhipidocephala* as used in the present study. It is not even a particularly distinctive species of *Rhipidocephala*, but is separated from allied species by the combination of characters shown in the key.

♂ *Head*. Face and frons shining black with ashy tomentum, mostly grey, but with a brown band through bases of antennae, and ocellar tubercle with brown tomentum. Bare, shining black area of face lunate, lying entirely dorsal to moustache, which is rather reduced, and lies near epistoma ; bristles yellow. Antennae of type D (Text-fig. 4) but with second segment of style thinner and more pointed, and with longer, sparser hairs in apical half ; hairs of two basal segments yellow. Proboscis and palpi black with yellow hairs and bristles. Occiput with whitish tomentum and pale yellow hairs.

Thorax. Mesonotum with dense grey tomentum, more whitish laterally and posteriorly, and with prominent pattern of broad black-brown stripe, which ends abruptly posteriorly, flanked by two large, triangular spots. Pale hairs short anteriorly, but long and dense posteriorly. Pleura grey, without any obviously darker areas ; fine hairs and bristles yellow.

Abdomen. Dorsum extensively dull orange, not only membranous area but lateral tergites as well ; sternites more blackish. Hairs and bristles yellow. Male genitalia orange, large and prominent, in dorsal view forming an arch (Text-figs. 11, 12).

Legs. Femora black, except for narrowly red bases ; tibiae and basitarsi dull reddish, other tarsomeres more blackish. Bristles and clothing hairs yellow, latter denser than in many *Rhipidocephala.*

Wings dark brown, not appreciably lighter towards apex. Costal cell distinctly broadened.

♀ similar. Ovipositor short and inconspicuous.

Holotype in Inst. R. Sci. nat., Bruxelles, Belgium.

Distribution. Known only from URUNDI : Gihanga & Bubanza.

Rhipidocephala inconspicua **sp. n.**

Very similar to *tigrina,* including the structure of the antennae but separated by the dark brown postscutellum and by the male genitalia. The existence of this species supports the view that *Paroxynoton* Janssens is not generically distinct from *Rhipidocephala.*

♂ *Head.* Frons and face with yellowish grey tomentum, whiter on face, browner on frons ; ocellar tubercle with dark brown tomentum. Bare facial area shining black, ovoid, immediately dorsad of a rather sparse yellow moustache. Antennae as described for *tigrina*, type D (Text-fig. 4), with second segment of style elongate and finely pointed, with longer black bristles in apical half. Hairs of basal two segments pale. Hairs of basal two segments pale. Palpi and proboscis black with yellow hairs and bristles. Occiput uniformly covered with white tomentum and pale yellow hairs.

Thorax. Tomentum of mesonotum extensively grey posteriorly and laterally. Median stripe very broad anteriorly, indistinctly merging with the two large spots, but ending abruptly level with bases of wings. Erect hairs rather sparse on dark areas, but dense and very pale on grey posterior area and on grey scutellum. Pleura with dense ashy grey tomentum, darker brown round anterior spiracle and margins of mespleuron. Hairs yellow. Postscutellum dark brown like base of abdomen, and contrasting with grey pleura.

Abdomen whitish on membranous areas of tergites ; sclerotized tergites covered with ashy grey tomentum, dark brown on first two tergites, and narrowly at bases of others. Hairs pale yellow. Genitalia as in Text-fig. 13.

Legs. Femora black, tibiae and tarsi orange, other tarsomeres darker. Clothing hairs and bristles yellow.

Wings dark brown, no paler area. Halteres yellow.

Length of body 6 mm. ; of wing 6 mm.

♀ similar. Eighth segment forming a short ovipositor, but still covered with tomentum.

Holotype ♂. KENYA : Gasi-Mombasa, v.1944 (*E. Opiko*). In B.M. (N.H.).

Paratypes : KENYA : Gasi-Mombasa, v.1944 (*E. Opiko*), 1 ♀ ; Gasi, xi.1927 (*van Someren*), 1 ♂, 1 ♀ ; Diana Beach, vii.1951 (*N. L. H. Kraus*), 1 ♀. TANGANYIKA : Tanga, vi.1932 (*Miss A. Mackie & J. Ogilvie*), 2 ♂, 3 ♀.

Rhipidocephala distincta **sp. n.**

The thoracic pattern sets this species apart from any other. Besides the usual large grey area posteriorly, the anterior third of the mesonotum is also entirely yellowish grey, reducing the dark pattern to a transverse row of three spots.

♂ *Head.* Tomentum yellowish grey : ocellar tubercle, and a transverse band immediately above antennae, dark brown. Ocellar tubercle with fine yellow hairs, which also appear on vertex and postvertex, but not on sides of frons. Face with yellowish grey tomentum and a lunate, bare, shining black area above moustache, which is about half height of face, and has rather scattered yellow bristles. Antennae of type A (Text-fig. 4), black, basal segments with yellow hairs. Palpi and proboscis black with yellow hairs and bristles. Occiput entirely covered with white tomentum and pale yellowish hairs.

Thorax. Mesonotum strongly arched, almost semicircular in outline, covered with dense yellowish grey tomentum, which is extensive anteriorly as well as posteriorly: dull brown stripes reduced to a transverse row of three spots. Fine, pale yellowish hairs long and erect, over entire mesonotum and scutellum. Pleura entirely covered with yellowish grey tomentum and pale yellowish hairs, except for dark brown colour in notopleural area and on posterior spiracle.

Abdomen dorsally with membranous area indicated, but less extensive than shown in Text-fig. 5. Entire dorsum light brown, laterally with dense tufts of long, fine yellow hairs; ventrally with more greyish tomentum and fine yellow hairs. Male genitalia (Text-fig. 14) orange, exserted, but not very prominent, claspers with a characteristic row of strong bristles.

Legs reddish yellow, fore and middle femora indistinctly darkened, especially anteriorly. Hairs and bristles entirely yellow, clothing hairs dense and relatively long.

Wings uniformly brown, costal cell broadened.

Length of body 5 mm.; of wing 5 mm.

♀ similar. Ovipositor short, stout, simple.

Holotype ♂. MOÇAMBIQUE: Inhambane, ii.1924 (*R. F. Lawrence*). In B.M. (N.H.).

Paratypes: MOÇAMBIQUE: Inhambane, ii.1924 (*R. F. Lawrence*), 5 ♂, 2 ♀.

Rhipidocephala fulva **sp. n.**

Distinguished from *flavipes* and other yellow-legged species by having also a tawny thorax and abdomen, with abundant long, yellow hairs.

♂ *Head.* Frons and face covered with dark, yellow-brown tomentum, ocellar tubercle and sides of vertex with rather short, yellow-brown hairs. Face with a large, ovoid, bare spot, shining brown, and with a rather sparse moustache of well-separated yellow-brown hairs. Antennae of type D (Text-fig. 4) black, with yellow hairs on first two segments. Proboscis and palpi with yellow hairs on a black ground. Occiput with yellow-brown tomentum and short yellow hairs.

Thorax. Mesonotum yellowish grey, with the usual dark brown pattern of median stripe and two spots, all obscured by dense, long, tawny hairs. Pleura yellowish grey with few yellowish hairs; notopleural region and two spiracles dark brown.

Abdomen extensively membranous dorsally, sclerotized areas also clear yellow-brown, with yellow hairs. Venter similar. Male genitalia also yellow, small and inconspicuous (Text-fig. 17).

Legs clear yellow, tarsomeres becoming progressively darker. Hairs and bristles yellow, bristles of femora and tibiae unusually long and strong.

Wings uniformly brown, costal cell rather expanded. Halteres yellow.

Length of body 6 mm.; of wing 6 mm.

♀ closely similar. Ovipositor scarcely exists, but lamellae protrude from a shining eighth segment.

Holotype ♂. CAPE PROVINCE: Kruger National Park, 29.xi.54 (*C. H. Andrewes*). In B.M. (N.H.).

Paratypes: CAPE PROVINCE: Kruger National Park, 29.xi.1954 (*C. H. Andrewes*), MOÇAMBIQUE: Inhambane, i.1924 (*R.F.Lawrence*), 1 ♀. TRANSVAAL: Potgietersrust, 6.xii.1953 (*F. Zumpt*), 1 ♂. BECHUANALAND: nr. Nata, xii.1954 (*F. Zumpt*), 1 ♀. S. RHODESIA: Sawmills, 31.xii.21 (?collector), 1 ♂, 1 ♀.

Rhipidocephala flavipes Hermann

Rhipidocephala flavipes Hermann, 1926, *Verh. zool-bot. Ges. Wien* **74** : 177.

Descriptions made from the syntypes in the Naturhistorisches Museum, Vienna.

Conspicuous yellow-brown male genitalia, epandrium divided into two rolled and leaf-like upper forceps, with a large apical notch. Legs with only femora black, tibiae and some tarsal segments red.

♂ *Head.* Face and frons covered with dense yellowish white tomentum, leaving bare and shining black a semicircular area in middle of face to which pale yellow moustache is confined. Basal antennal segments dull black (Ant. III broken off), with pale yellow hairs. Proboscis and palpi black with yellow hairs. Beard and occipital hairs all pale yellow.

Thorax. Mesonotum with long, dense, pale yellow hairs. Tomentum dull greyish, stripes distinct, median stripe broad, complete anteriorly, stopping before reaching scutellum. Pleura with uniformly greyish tomentum and pale yellowish hairs.

Abdomen. Tergites and sternites covered with dense grey tomentum, only hind margins of posterior segments a little brownish. Hairs long, pale yellowish. Genitalia yellow-brown, translucent (Text-figs. 15, 16).

Legs. Coxae black with greyish tomentum ; trochanters shining black. Femora shining black with orange knees, and a little more orange colour on hind femora. Fore and middle tibiae dull reddish, black ventrally ; tarsi black ; hind tibiae and basitarsi orange, rest of hind tarsus black. All legs with yellowish bristles, and covered with recumbent yellow hairs.

Wings rather broad, uniformly dark brown. Halteres pale yellow.

Length of body 5 mm. ; of wing 5 mm.

♀ similar except for rather more orange on all femora. Third antennal segment awl-shaped, with style and microsegment more than half its total length. Female terminalia also orange, short, downturned.

Syntypes 1 ♂, 1 ♀ in Vienna Museum, lent to me for study. The labelling and probable origin of these specimens has been discussed earlier in this paper.

Distribution. E. CAPE PROVINCE : Kathberg, 4,000 ft., 1–15.i.1933 (*R.E. Turner*), 2 ♂, 1 ♀ agree in genitalia, and in other respects except for variations in leg colour. TRANSVAAL : Skukuze, 23.xi.1959 (*F. Zumpt*).

Rhipidocephala umbripennis (Loew)

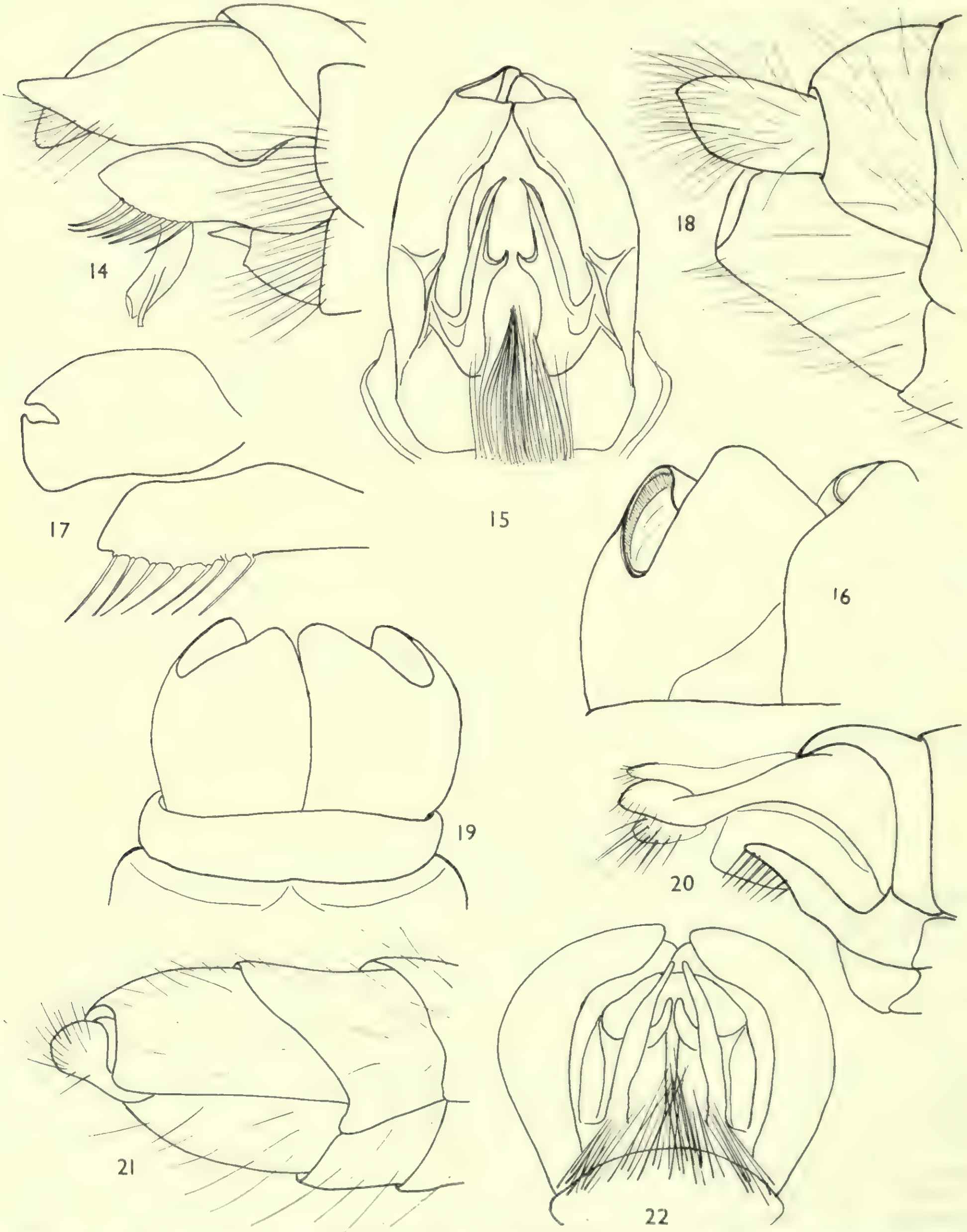
Discocephala umbripennis Loew, 1858, *Öfv. Kongl. Vet.-Akad. Forhandl.* **14** : 351 ; 1860, *Dipt.-fauna. Südafr.* **1** : 97.

The combination of colour-characters given in the key distinguish this species from any other.

♂ *Head.* Frons and face with greyish white tomentum, only slightly darker on frons ; ocellar tubercle slightly brownish. Hairs mainly pale yellowish, at sides of frons as well as on ocellar tubercle, but rather sparse. Moustache of pale yellowish hairs, extending almost up to antennae with a large, ovoid, bare black spot in its dorsal part. Antennae of type D (Text-fig. 4), basal segments with pale yellowish hairs. Proboscis and palpi black with pale yellowish hairs. Occiput whitish with very pale yellowish hairs.

Thorax. Mesonotum yellowish grey with median dark brown stripe extending almost to scutellum, and with lateral brown areas. Scutellum entirely brownish grey. Hairs erect, moderately long, pale yellowish. Pleura ashy grey, indistinctly brownish in part, hairs and bristles pale yellowish.

Abdomen dorsally with large, membranous areas as in Text-fig. 5; brown in colour; lateral sclerites ashy grey, with rather long, pale yellow hairs. Venter dark grey with rather shorter pale yellow hairs. Genitalia bright orange, conspicuous; upper forceps curled, leaf-like (Text-fig. 19).



FIGS. 14–22. Genitalia of *Rhipidocephala*: 14, *distincta* ♂; 15, 16, *flavipes* ♂; 17, *fulva* ♂; 18, *umbripennis* ♀; 19, *umbripennis* ♂; 20, *tenera* ♂; 21, *tenera* ♀; 22, *zumpti* ♂.

Legs. Coxae like pleura. Trochanters and femora shining black except for knees, which are red, very narrowly so on fore and middle femora, more broadly so on hind femora. Tibiae dull reddish, a little darker apically. Tarsi black except for base of basitarsus, which is red, more extensively so on hind basitarsus. All clothing hairs and bristles yellow.

Wings broad, with broadened costal cell. Dark brown. Halteres orange.

Length of body 6 mm. ; of wing 6 mm.

♀ similar. Ovipositor short, stout, orange (Text-fig. 18).

Holotype in Riksmuseet, Stockholm.

Distribution. CAPE PROVINCE. NATAL.

***Rhipidocephala tenera* sp. n.**

Closely similar in colour to *umbripennis*, but distinguished in both sexes by the very different genitalia (Text-figs. 18–21).

♂ *Head.* Frons and face with dull bronze tomentum, only ocellar tubercle and small areas near antennae darker brown. Hairs yellow, those on ocellar tubercle and adjoining areas of vertex rather short. Moustache yellow, extending about half height of face, and with a transverse, shining black area above it. Antennae of type C (text-fig. 4), black, basal segments with pale hairs. Proboscis and palpi black with yellow hairs. Occiput yellowish grey with pale yellow hairs.

Thorax. Mesonotum yellowish grey with usual pattern of dark brown stripes. Median stripe short, lateral stripes distinct. Hairs shorter than in *umbripennis*, yellow. Pleura grey, mesopleuron brown, hairs and bristles yellow.

Abdomen dorsally a large membranous area (Text-fig. 5) is yellow. Sclerites also yellow anteriorly, especially second segment, but become obscured by greyish tomentum on other segments. Venter yellowish grey. Hairs short, yellow. Genitalia bright orange, but of a different form from those of *umbripennis* (Text-figs. 19, 20).

Legs. Coxae like pleura. Femora shining black, red tips a little more extensive than in *umbripennis*. Tibiae and tarsi also more extensively red than in *umbripennis*, only tips of tarsi darker. Hairs and bristles orange.

Wings broad, costal cell expanded, uniformly dark brown. Halteres orange.

Length of body 5 mm. ; of wing 5 mm.

♀ similar. Genitalia orange, shape as in Text-fig. 21.

Holotype ♂. TRANSVAAL : Skukuze, 23.xi.1959 (*F. Zumpt*). In South African Institute for Medical Research, Johannesburg.

Paratypes : TRANSVAAL : Skukuze, 23.xi.1959 (*F. Zumpt*), 3 ♂, 4 ♀.

***Rhipidocephala zumpti* sp. n.**

Unique in the genus because of its ashy grey mesonotum, in which the stripes, though faintly visible, are almost completely obscured. Legs black but moustache white. The strongly curved male genitalia (Text-fig. 22) are also unique.

♂ *Head.* Face and frons covered with white tomentum, only a little more brownish near antennal bases and on ocellar tubercle. Hairs of tubercle and sides of vertex short, yellow. Face with a large, semi-circular bare area, shining black, in its upper half ; moustache pale yellow, thin and straggly but extending over black area as well as over tomented area of epistoma. Antennae type D (Text-fig. 4), black, basal segments with yellow hairs. Proboscis and palpi black with yellow hairs. Occiput ashy grey with pale yellow hairs.

Thorax with dense light grey tomentum, and only the merest indication of darker stripes; pale yellow bristles dense, long, erect, curved. Pleura grey, mesopleuron more brownish, hairs pale yellowish.

Abdomen dorsally membranous (Text-fig. 5), dull orange; lateral and ventral sclerites grey-brown, with short, pale yellowish hairs. Male genitalia orange, large, strongly curved (Text-fig. 22).

Legs black, narrowly red at knees, but on tibiae, not on femora. Clothing hairs and bristles pale yellow.

Wings moderately broad, a little expanded in costal cell, uniformly dark brown. Halteres orange.

Length of body 6 mm.; of wing 6 mm.

♀. Not yet known.

Holotype ♂. TRANSVAAL: Sabie, i.1952 (*F. Zumpt*). In South African Institute for Medical Research, Johannesburg.

Rhipidocephala caffra (Macquart)

Discocephala caffra Macquart, 1846, *Dipt. exot. Suppl.* **1**: 70; Loew, 1860 *Dipt.-fauna. Südafr.* **1**: 97.

Rhipidocephala caffra (Loew) [*err. pro* Macquart] Hermann, 1926, *Verh. zool.-bot. Ges. Wien* **74**: 178.

This is perhaps the most distinctive species of *Rhipidocephala*, recognized not only by its dark wings and entirely black legs—which it shares with several other species, including *umbripennis* Loew—but also by the form of the antennae (Text-fig. 4B). The second microsegment is relatively long and hairy, and bears a dorsal spine. Some authors (e.g. Hull, 1962: 64) have attempted to make this type of antenna diagnostic of the genus *Rhipidocephala*, but it is not possible to do so.

♂ *Head.* Tomentum of frons velvety dark brown, with a yellow area on each side of ocellar tubercle, and a median black line. A tuft of fine yellow hairs on each side of vertex. Ocellar tubercle black, with numerous long yellowish hairs. Facial tomentum more greyish, with moustache of black-brown hairs occupying a large, cordiform, bare black area. Proboscis and palpi black with black-brown hairs. Occiput with white tomentum on eye-margin, more brown posteriorly, where hairs are yellowish, merging ventrally into a yellowish white beared. Antennae (Text-fig. 4) of type B, black, with hairs black and yellowish, only first segment perhaps a little reddish; second microsegment relatively long, with dorsal notch and spine.

Thorax ashy greyish brown with only indistinct traces of two longitudinal stripes and of dark areas above wings; humeri, postalar calli and scutellum of same greyish coloration. Hairs of mesonotum and scutellum long, fine. Pleura with ashy grey tomentum, and yellow hairs; mesopleuron with numerous hairs, both dorsally and posteriorly; metapleuron with a vertical band of strong yellow bristles.

Abdomen very incompletely sclerotized on mid-dorsal area; transverse bridges at base of first segment and middle of second (Text-fig. 5). Membranous areas brown, sclerotized areas dull blackish, with narrow yellowish posterior margins on posterior segments. Long yellowish hairs. Venter similar, but entirely sclerotized. Male genitalia orange, often more or less concealed. (Text-figs. 23–25).

Legs black, with yellow clothing hairs and bristles.

Wings dark brown to the naked eye, sometimes paler by transmitted light, but only indistinctly paler apically.

Length of body 7 mm.; of wing 7 mm.

♀ closely similar; no ovipositor, only quadrate lamellae visible. Sometimes, especially in males, the hairs of the head and mesonotum may be black-brown, or even blackish.

Holotype in Muséum National d'Histoire Naturelle, Paris.

Distribution. CAPE PROVINCE. NATAL. PORTUGUESE EAST AFRICA.

Rhipidocephala morio Hermann

Rhipidocephala morio Hermann, 1926, *Verh. zool.-bot. Ges. Wien* **74** : 180.

One of two species with dull, dark brown thorax, and hardly any trace of stripes, *morio* is distinguished from *caffra* by the more strongly convex thorax and the shorter antennae. *R. caffra* is a S. African species, and *R. morio* is a species of the southern Sahara, from Abyssinia (type locality) westwards across to the Gambia. All the western specimens have the bristles paler than those described by Hermann, but a female from the Katanga has dark bristles.

♂ *Head.* Frons and face strongly contrasting ; frons and ocellar tubercle dark brown, with yellow hairs on tubercle and on sides of vertex ; face with whitish tomentum, leaving an elliptical, bare, black patch above sparse yellow bristles of moustache. Antennae of type B (Text-fig. 4), black basal segments with yellow hairs [black according to Hermann] ; proboscis and palpi black with yellow hairs. Occiput grey along eye-margins, brown in centre, with rather inconspicuous pale yellow hairs.

Thorax. Mesonotum does have usual pattern of dark stripe flanked by two dark spots, but this is obscured, usually almost completely, by dark brown tomentum ; sometimes pattern moderately visible ; lateral and posterior margins, including scutellum brown. Hairs dense, long, erect, yellow-brown. Pleura dark brown, hairs yellow-brown.

Abdomen dorsally membranous (Text-fig. 5), whitish ; sclerotized areas dark chocolate-brown, with grey hind margins and large grey lateral spots. Venter grey. Hairs pale yellowish, longer laterally and ventrally. Male genitalia black (Text-fig. 26).

Legs black with yellow clothing hairs and long yellow bristles.

Wings only moderately broad and slightly expanded in costal cell. Uniformly dark. Halteres orange.

Length of body 5 mm. ; of wing 5 mm.

♀ quite similar. Ovipositor short, black. (Text-fig. 28).

Holotype ? in Vienna. It was not in the material kindly lent to me by Prof. Max Beier. Hermann's description agrees with the specimens described above, except that he consistently mentions darker, browner hairs.

Distribution. Type locality is ABYSSINIA : Harar. Specimens seen by me from S. NIGERIA, GHANA & GAMBIA. A single ♀ in the Musée R. de l'Afrique centrale, Tervuren is from KATANGA : Mulungivishi, i.1931 (*G. F. de Witte*), and has dark hairs as described by Hermann.

Rhipidocephala signata (Hermann)

Holcocephala (*Discocephala*) *signata* Hermann, 1907, *Z. syst. Hymenopt. Dipterol.* **7** : 11.

A dark brown species with black legs, distinguished by its inconspicuous yellow male genitalia, and by the thoracic pattern, with a short, detached, black-brown median stripe just before scutellum.

♂ *Head.* With dense tomentum, more brownish on frons, more greyish on face. Facial bare area kidney-shaped, transverse, extended towards mouth margin by a fine line. Face and frons rather bare of soft hairs ; bristles of ocellar tubercle and of moustache stiff, bristly, and of a black-brown, shifting colour, which Hermann calls *pechbraun*. Antennae black: second segment of style long and with a dorsal style (type B, Text-fig. 4). Palpi and proboscis black, with *pechbraun* hairs. Occiput white on eye-margins, brown elsewhere, with black hairs.

Thorax. Mesonotum brownish grey with distinct dark brown pattern; a pair of parallel median stripes terminate just behind suture, and are succeeded by a single, short, median stripe reaching about to scutellum; laterally three spots, one near humeral lobe, and other two centred on transverse suture. Scutellum grey. Hairs dark brown, erect, fine, no strong bristles. Pleura mainly grey, but triangular area of more yellow-brown tomentum extends from base of fore coxa to include entire mesopleuron. Hairs and bristles long, yellow.

Abdomen. Dorsum extensively excavated, with the usual transverse bar across the second segment; sclerotized areas yellowish grey, with whitish segmentations and yellow hairs and bristles; venter similar. Male genitalia yellow, inconspicuous, almost concealed beneath seventh tergite, which is also yellow.

Legs shining black, covered with yellow hairs and bristles.

Wings blackish, a little paler apically, and with paler centres in a few of the cells. Halteres yellow.

Length of body 6 mm.; of wing 5 mm.

♀ similar. Ovipositor also yellow, short, and mostly concealed beneath a yellow seventh segment.

Holotype ♂ in Naturhistorisches Museum, Vienna, kindly lent to me by Prof. Max Beier.

Distribution. CAPE PROVINCE: Willowmore (*Dr. Brauns*), ♂ holotype, 1 ♀ paratype in Vienna. A series of specimens in the British Museum, determined as *signata* Hermann by Engel, have quite different, very prominent, male genitalia, as well as differences in thoracic pattern, and are described elsewhere in this paper as *engeli* sp. n.

Rhipidocephala congoiensis sp. n.

A widespread species of the Congo Basin, distinguished from *signata* Hermann and *scutata* sp. n. by the different pattern of thoracic stripes; characteristic of *congoiensis* is the extension of the lateral stripes beyond the median stripe.

♂ *Head.* Frons and face with uniform dull golden tomentum, ocellar tubercle brown. Hairs of tubercle yellow; no hairs on frons proper. Face with a large, ovoid, bare, shining black spot, placed dorsally to a sparse yellow moustache. Antennae of type D (Text-fig. 4), but final segment tapering more, and with longer black hairs; two basal segments with yellow hairs. Proboscis and palpi black with yellow hairs. Occiput grey with yellow hairs.

Thorax. Mesonotum grey with very distinct brown pattern: median stripe cut short before reaching scutellum, but lateral stripes unusually long, prolonged by prescutellar spots. Hairs erect, pale yellow. Pleura ashy grey and brown, brown especially on mesopleuron; hairs pale yellow.

Abdomen. Dorsum membranous (Text-fig. 5), orange. Sclerites brown with orange hind margins, first two more generally orange. Hairs golden yellow. Venter brown with brassy tomentum and golden hairs. Male genitalia (Text-figs. 29, 30) yellow, fairly prominent.

Legs all black except very narrowly at knees, covered with dense yellow hairs and long yellow bristles.

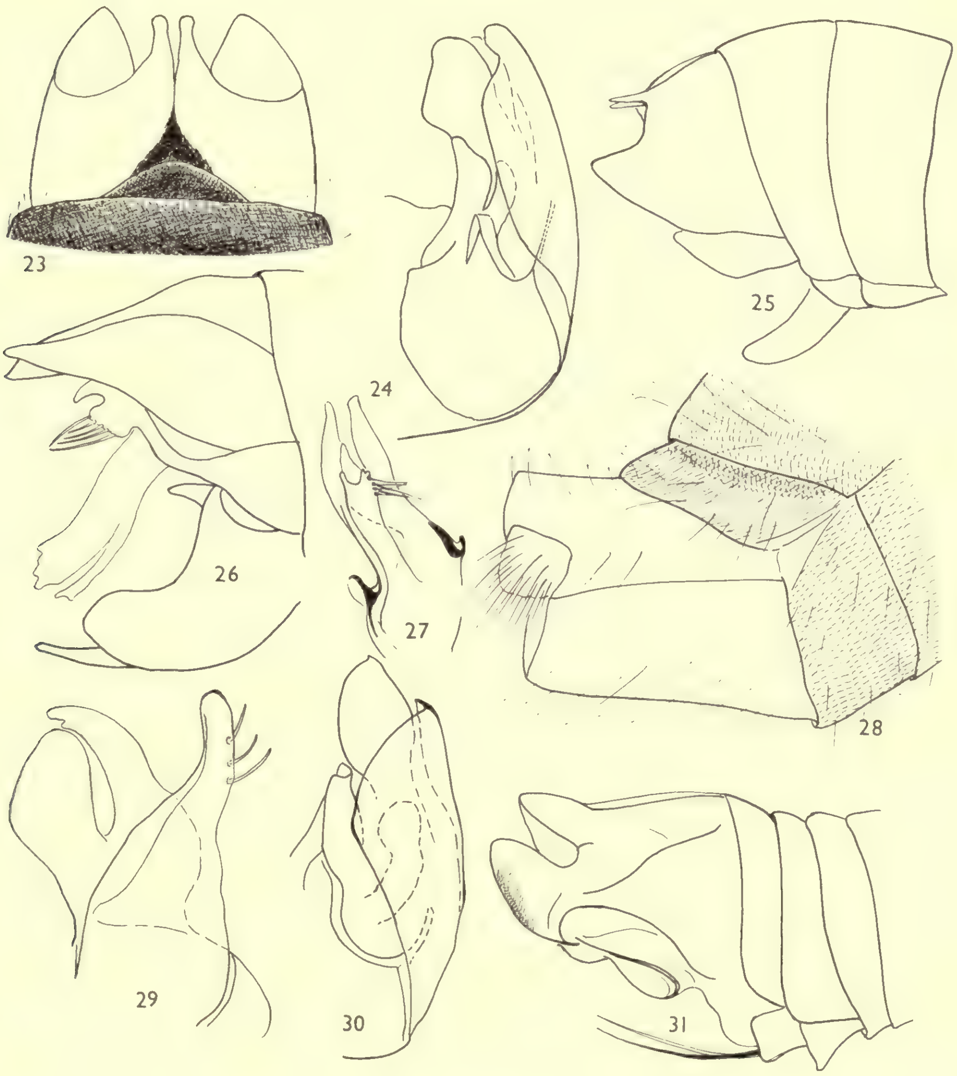
Wings only moderately broad, and costal cell not appreciably expanded, uniformly dark brown. Halteres orange.

Length of body 5 mm.; of wing 5 mm.

♀ similar. Genitalia compact, orange.

Holotype ♂. Congo : Kasai, 1928 (*Dr. Walker*) in Musée R. de l'Afrique Centrale, Tervuren, Belgium.

Paratypes. Congo : Kasai, 1928 (*Dr. Walker*), 3 ♂, 3 ♀; Dolo, xi.1912 (*F. Chaltin*), 4 ♂, 1 ♀; Lomami, Katompe, 12.xiii.1923 (*Dr. M. Bequaert*), 2 ♀.



Figs. 23–31. Genitalia of *Rhipidocephala* : 23–25, *caffra* ♂ ; 26, *morio* ♂ ; 27, *scutata* ♂ ; 28, *morio* ♀ ; 29, 30, *congoiensis* ♂ ; 31, *engeli* ♂.

Rhipidocephala scutata sp. n.

Distinguished from *congoiensis* sp. n. by the thoracic pattern, in which the stripes are heavily marked, and coalesced in the anterior half of the thorax ; posterior half grey, with long yellow hairs. Frons and face sharply differentiated in colour.

♂ *Head.* Frons with yellow and brown tomentum, ocellar tubercle dark brown ; hairs short, yellow, confined to tubercle. Face with brassy yellow tomentum and an oval, bare spot dorsal to sparse yellow moustache. Antennae of type D (Text-fig. 4), black, basal segments with yellow hairs. Occiput grey on eye-margins, brown centrally, with yellow hairs.

Thorax. Mesonotum densely covered with tomentum, which is pale yellow laterally and posteriorly, including scutellum, stripes dark brown, heavily marked, tending to coalesce. Hairs long, especially posteriorly, yellow. Pleura yellowish grey, with extensive dark brown patches, especially on sutures and on anterior of mesopleuron. Sparse hairs yellow.

Abdomen. Dorsum extensively membranous (Text-fig. 5), dull orange ; sclerites ashy grey with yellow hairs. Venter blackish, with light yellow hairs. Genitalia black, protruding, but rather small, clasper with its spines well displayed (Text-fig. 27).

Legs black with yellow hairs and bristles.

Wings dark brown, moderately broadened, costal cell a little expanded.

Length of body 5 mm. ; of wing 5 mm.

♀ similar. Ovipositor formed from a stout eighth segment, dully shining.

Holotype ♂. CONGO : GARAMBA National Park, 3449, II/gd/4, 8.v.1952 (*De Saeger*). In Institut des Parcs Nationaux du Congo, Brussels.

Paratypes : CONGO : Parc National du Garamba, Mission H. De Saeger, 3449, II/gd/4, 8.v.1952 (*De Saeger*), 1 ♂, 1 ♀ ; 1887, II/gd/7, 8.vi.1951 (*De Saeger*), 1 ♀ ; 1588, II/hc/4, 20.iv.1961 (*Verschuren*), 10 ♂, 4 ♀ ; 1824, II/fd/27, 28.v.1951 (*De Saeger*), 1 ♂ ; 469, I/a/1, 1.v.1950 (*Demoulin*), 1 ♀ ; 3678, Ndelele, 4, 18.vi.52 (*De Staeger*), 1 ♂, 2 ♀ ; 3323, Pidigala, 23.iv.1952 (*De Saeger*), 2 ♂, in Institut des Parcs Nationaux du Congo, Brussels.

KIVU : Uvira, xi.1922 (*Ch. Seydel*), 3 ♂, 4 ♀ ; 16–23.iii.1953 (*P. Basilewsky*), 2 ♂, 3 ♀, in Coll. Musée de l'Afrique centrale, Tervuren, Belgium.

Rhipidocephala engeli sp. n.

This is a very distinctive species, with characteristic male genitalia (Text-fig. 31). The series in the British Museum was previously identified by the late Dr. E. O. Engel as *signata* Hermann, but the material lent to me from Vienna shows it to be quite distinct.

A grey species with light brown thoracic markings, concentrated especially posteriorly (including scutellum) ; genitalia in both sexes yellow, especially prominent in male (Text-fig. 31).

♂ *Head.* Frons and face with grey tomentum and a bar of dark brown tomentum through bases of antennae. A large, ovoid, shining bare spot underlies most of moustache, which reaches nearly to antennae. Hairs of frons and of moustache pale yellow. Antennae of type D (Text-fig. 4), black, basal segments with yellow hairs. Palpi and proboscis black, with pale yellow hairs. Occiput white with pale yellow hairs.

Thorax. Mesonotum densely tomented, mainly dark brown, including scutellum : in well preserved specimens three stripes can be seen, and anterior third of mesonotum, as well as lateral margins, grey: but in other specimens entire mesonotum dull blackish brown. Hairs pale yellowish, erect, rather long. Pleura grey, mesopleuron partly brownish, hairs and bristles pale yellowish.

Abdomen dorsally membranous (Text-fig. 5), dark brown, sclerotized areas with grey tomentum and long, pale hairs; venter similar; both dorsally and ventrally hind margins of segments indistinctly yellowish. Male genitalia bright orange, relatively huge, about half as long as abdomen, with prominent lobes on upper forceps (epandrium) (Text-fig. 31).

Legs black with yellow clothing hairs and yellow bristles.

Wings dark brown, expanded, costal cell broadened.

Length of body 5 mm.; of wing 5 mm.

♀ similar. Eighth segment stout, yellow, forming short ovipositor.

Holotype ♂. NATAL: Weenen (*H. P. Thomasett*). In B.M. (N.H.).

Paratypes: NATAL: Weenen (*H. P. Thomasett*), 6 ♂, 13 ♀.

Rhipidocephala fimbriata sp. n.

A distinctive species, with coarse yellow hairs abundant on head and thorax; a shining black abdomen with very prominent lateral fringes of yellow hairs; black femora and orange tibiae; and genitalia as shown in Text-figs. 32, 33.

♂ *Head*. Frons and face with grey tomentum. On frons it is denser and allows bare, shining ground colour to show through; long, yellow hairs abundant laterally and on ocellar tubercle. Face entirely tomented, without any bare area; moustache of abundant, coarse yellow hairs extends to bases of antennae. Antennae of type C (Text-fig. 4), basal segments with abundant yellow bristles. Palpi and proboscis black, with yellow bristles. Occiput with brownish white tomentum and with abundant, strongly curved, yellow hairs.

Thorax. Mesonotum completely tomented, ashy grey, with usual pattern of black-brown stripes. Scutellum entirely grey. Mesonotum and scutellum covered with very long, erect, curved yellow bristles. Pleura black, covered with brassy yellow tomentum and with bright yellow hairs. Hairs of pronotum also abundantly long, erect, yellow.

Abdomen black, dorsally shining through thin tomentum; entirely sclerotized, and with no dorsal membranous areas; dorsally with many short and sparse yellow hairs, but laterally and ventrally with a broad band of yellowish tomentum, covered with long, golden, bristly hairs. Male genitalia bright orange, prominent, upper forceps hoodlike, as shown in Text-fig. 33.

Legs. Coxae like pleura. Femora and tarsi shining black with thin yellow tomentum and yellow hairs and bristles; tibiae bright orange.

Wings broad, costal cell expanded, entirely dark brown. Halteres orange.

Length of body 8 mm.; of wing 8 mm.

♀ similar. Large and shining black eighth segment forms a conspicuous ovipositor (Text-fig. 32).

Holotype ♂. CAPE PROVINCE: Wellington, Witte R., 1922 (*Laurence*). In the B.M. (N.H.).

Paratypes: CAPE PROVINCE: 13 m. N.E. of Touws R., 26.x.1938 (*R. E. Turner*), 2 ♀; Ceres, xi.1920 (*R. E. Turner*), 1 ♀; Montagu, x.1919 (*R. Tucker*), 1 ♀; Cape Town, Cape Point, 15–21.xi.1930 (*H. W. Simmonds*).

Rhipidocephala manicata sp. n.

Another species of the group with no facial bare area, and with little or no membranous area dorsally on the abdomen. Easily distinguished from *fimbriata* sp. n. by the much less conspicuous lateral fringes of the abdomen, and by the male genitalia (Text-figs. 33, 34).

♂ *Head*. Frons and face with dense, yellowish grey tomentum ; only a small black spot on frons is bare and shining ; ocellar tubercle with brown tomentum and brown hairs, brown hairs also laterally on frons. Face without any bare area, and with a moustache of shining brown hairs extending almost to antennae. Antennae of type D (Text-fig. 4) ; hairs of basal segments brown. Palpi and proboscis black with brown hairs. Occiput with white tomentum and dense, silky brown hairs.

Thorax. Mesonotum ashy grey, with rather indistinct brown pattern. Clothing hairs erect, but only moderately long, brown. Pleura with grey tomentum, brown on mesopleuron ; hairs silky, brown, dense all over mesopleuron, on metapleuron, and on prothorax.

Abdomen dorsally with some membranous areas, but less so than usual in this genus ; a transverse area on boundary between first and second segments dull red, and obscure areas on other segments slightly so ; sclerotized areas black, shining through very thin brown tomentum, and with bristly brown clothing hairs covering whole area, longer and stronger laterally, long and fine ventrally. Male genitalia (Text-fig. 34) red and black, prominent.

Legs. Coxae like pleura. Femora shining black, covered with short yellow bristles ; tibiae red with black tips ; tarsi black, hairs and bristles concolorous.

Wings broad, costal cell broadened, brown. Halteres yellow.

Length of body 8 mm. ; of wing 8 mm.

♀. Not yet known.

Holotype ♂. NAMAQUALAND : Springbok (*R. Lightfoot*). In B.M. (N.H.).

***Rhipidocephala speciosa* sp. n.**

Distinguished from *manicata* sp. n. by the blackish rather than ashy appearance, and in particular by having silky yellow hairs, in place of the rather coarse brown hairs of *manicata*.

♂ *Head*. Tomentum of frons and ocellar tubercle dark brown, contrasting sharply with dense yellow tomentum of face. Ocellar tubercle and sides of vertex with yellow hairs ; face entirely without bare area, and with a rather diffuse moustache covering most of facial area. Antennae of type C (Text-fig. 4), black, basal segments with yellowish hairs. Occiput with yellowish white tomentum and dense, curved, yellow hairs.

Thorax. Mesonotum black-brown, with mere traces of longitudinal dark stripes ; humeri, lateral margins and scutellum covered with yellow tomentum. Pleura with uniformly yellowish white tomentum. Mesopleuron and metapleuron each with yellow hairs or bristles.

Abdomen almost completely sclerotized, with merest indications of transverse membranous slit between segments 1 and 2. Black, with very fine yellow hairs which become coarser laterally. Venter with yellowish tomentum and long, silky yellow hairs. Male genitalia yellow, prominent, hood-like (Text-fig. 36).

Legs relatively stout for the genus. Femora, tips of tibiae, and tarsi black ; tibiae yellow except for tips. Hairs and bristles yellow, even on tarsi.

Wings broad, with expanded costal cell, uniformly dark brown, scarcely paler at tip. Halteres yellow.

Length of body 6 mm. ; of wing 6 mm.

♀. Not yet known.

Holotype ♂. CAPE PROVINCE : Paarl, 24.x.1954 (*C. H. Andrewes*). In B.M. (N.H.).

Rhipidocephala doornensis **sp. n.**

Among those species with entirely tomented face, *doornensis* sp. n. is unusual in having the dorsum of the abdomen fully membranous as in Text–fig. 5. It differs from *speciosa* sp. n. in this, and in having the legs entirely black.

♂ *Head.* Frons and face entirely tomented ; frons a little darker brown than face, which is greyish at sides, more brownish in area of moustache, but without any distinct bare area. Ocellar tubercle and lateral margins of frons with yellow-brown hairs and bristles. Moustache yellow-brown. Antennae of type C (Text-fig. 4), black, first two segments with yellow hairs. Proboscis and palpi black with yellow hairs. Occiput grey with white hairs.

Thorax. Mesonotum black-brown, without pattern ; scutellum with a narrow grey rim. Long, erect, pale hairs yellowish. Pleura with grey tomentum and silvery white hairs on mesopleuron and before halteres.

Abdomen black-brown. Membranous area fully developed as in Text-fig. 5. Sclerites with whitish tomentum and pale yellow hairs. Venter similar, hairs dense. Male genitalia orange (Text-fig. 35).

Legs black with white hairs and yellow bristles.

Wings dark brown, costal cell broadened. Halteres yellow.

Length of body 5 mm. ; of wing 5 mm.

♀ not yet known.

Holotype ♂. CAPE PROVINCE : Doorn River, 3.xi.1931 (*Miss A. Mackie*). In B.M. (N.H.).

Rhipidocephala quadrifaria Hermann

Rhipidocephala quadrifaria Hermann, 1926, *Verh. zool.-bot. Ges. Wien* **74** : 179.

Distinguished, as Hermann pointed out, by the contrast between the partly shining dark crossband of the frons and the entirely tomented face, where darker tomentum replaces the clear spot that is common in this genus.

♀ *Head* with sharp contrast between frons and upper part of face ; frons partly shining black through thin dark brown tomentum, especially in a transverse band between ocelli and antennae. Face entirely tomented, brown on area covered by moustache, white above and laterally ; no bare spot. Hairs black-brown. Antennae of the form of *umbripennis* (type D, Text-fig. 4), black, with black-brown hairs. Proboscis and palpi black with black-brown hairs. Occiput white on eye-margins, darker elsewhere, with brown hairs.

Thorax. Mesonotum with brown tomentum and only indistinct traces of black-brown pattern ; scutellum dark brown with grey rim. Hairs black. Pleura more greyish, meso- and metapleuron yellowish, hairs yellowish, some rather bristly.

Abdomen black : dorsal membranous areas blackish, only a narrow, transverse slit on margin of segments 1–2 is yellow. Sides with denser grey tomentum and pale yellowish hairs. Ovipositor (Text-fig. 38) fairly long, shining black dorsally on seventh and eighth segments.

Legs shining black with yellow hairs and bristles.

Wings uniformly smoky-brown, only a little darker basally. Halteres yellow.

Length of body 5 mm. ; of wing 5 mm.

♂. Not yet known.

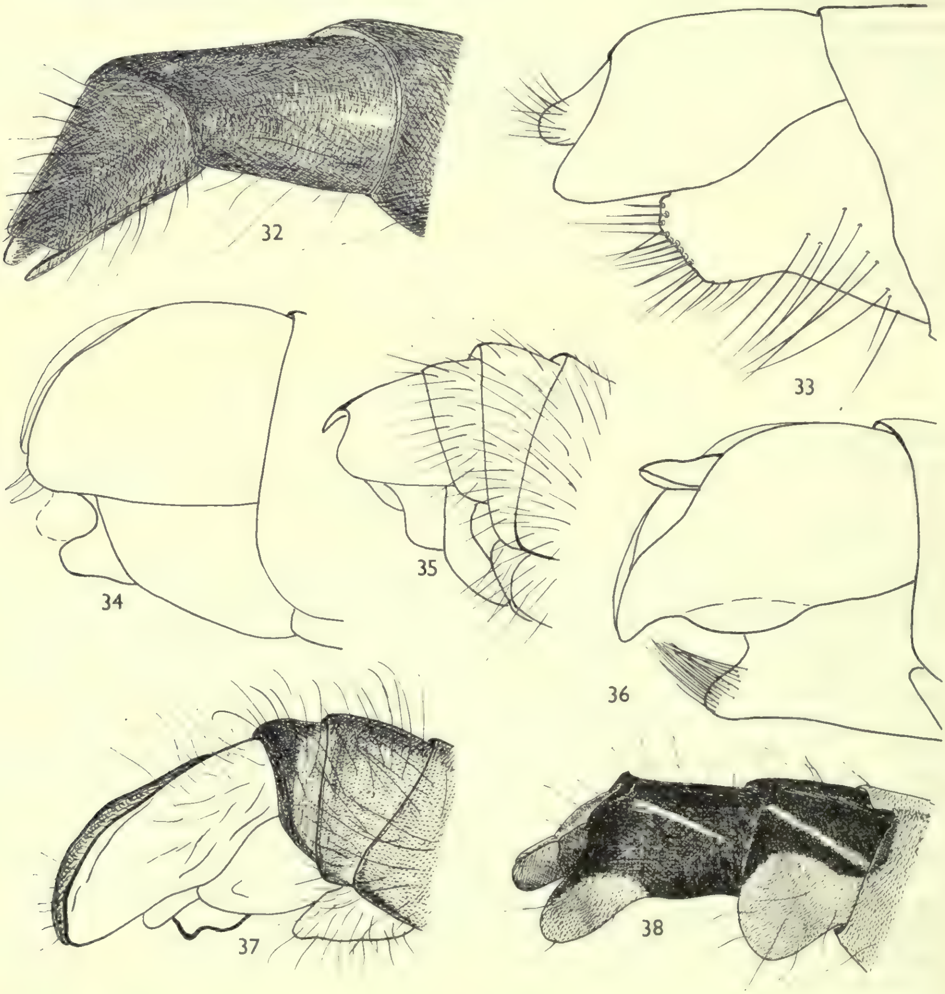
Holotype in Naturhistorisches Museum, Vienna, lent to me for study.

Distribution. CAPE PROVINCE : Algoa Bay, 16.xi.82 (*Dr. Brauns*).

Rhipidocephala angustior sp. n.

Discocephala analis Macquart; Hermann, 1926, *Verh. zool.-bot. Ges. Wien* **74**: 177. [misidentification]

The following description is based upon the male specimen in the Naturhistorisches Museum, Wien, which was kindly lent to me by Prof. Max Beier. Hermann wrote of this specimen that although it had no locality label, and despite certain differences, he felt convinced that it was correctly identified as being Macquart's *analis*. It seems to be conspecific with a female in the British Museum from S. Africa, which I had already set aside as an undescribed species.



FIGS. 32–38. Genitalia of *Rhipidocephala*: 32, *fimbriata* ♀; 33, *fimbriata* ♂; 34, *manicata* ♂; 35, *doornensis* ♂; 36, *speciosa* ♂; 37, *angustior* ♂; 38, *quadrifaria* ♀.

Among the species that have the male epandrium and the female ovipositor extended horizontally, *angustior* is distinguished by the leg colour, and by not having the fore margin of the wing expanded by broadening of the costal cell. In both sexes it is generally more furry than related species.

♂ *Head.* Frons and face entirely tomented: frons dark dully shining black through brown tomentum, and with abundant yellow hairs, not only on ocellar tubercle but on sides of frons as well; facial tomentum white above and laterally more brown beneath moustache, which is dense and dark yellow. Antennae black, type C (Text-fig. 4), basal segments with yellow hairs. Palpi and proboscis black with long yellow hairs [Macquart says: *palpes fauves*]. Occiput white on eye-margins, brown elsewhere, with abundant yellow hairs.

Thorax. Mesonotum grey with fairly distinct black-brown stripes, narrow median, tapering posteriorly, and lateral spots rather restricted in area. Posterior mesonotum and scutellum grey, latter with dense white rim. Hairs yellow, very long, erect and dense, giving thorax a furry appearance. Pleura grey, mesopleuron more brown, hairs pale yellowish or white.

Abdomen dorsally shining black, but entirely sclerotized, with no membranous area except for a narrow, yellow, transverse groove on segments 1–2. Dorsum of abdomen shining black, extreme sides narrowly margined with yellow tomentum; venter with yellowish tomentum. Hairs dense, fine, yellow, rather shorter dorsally, longer laterally and ventrally, giving a furry appearance. Male genitalia prominent, orange, epandrium extending posteriorly as two large, pointed lobes (Text-fig. 37).

Legs. Coxae like pleura. Femora shining black, red only at extreme base; tibiae and tarsi orange, each segment narrowly black at tip. Hairs and bristles of legs yellow.

Wings pale smoky, darker brown basally, and especially in costal cell, which is not broadened as it is in several related species.

Length of body 7 mm.; of wing 6 mm.

♀ similar, except that hairs are greyish rather than deep yellow. Ovipositor broad, flattened, bare and shining, eighth tergite being continuous with shining median band of abdomen.

Holotype ♀. CAPE PROVINCE: Ceres, ix.1920 (*R. E. Turner*). In B.M. (N.H.). I make one of the females holotype because the only male, the one seen by Hermann, is without even a continental locality.

Paratypes: CAPE PROVINCE: Ceres, 1–12.xi.1924 (*R. E. Turner*), 1 ♀; 1 ♂ paratype, without locality, in the Vienna Museum.

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D. E. KIMMINS

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CONTENTS

	Page
Introduction	175
List of Types in B.M. (N.H.)	176
References	219
Appendix. Location of Types not in B.M. (N.H.)	223

SYNOPSIS

The types or syntypes of 379 taxa of the species-group are dealt with, of which the types of 19 taxa, which should have been in the Fraser Collection, have not yet been traced. Neotypes of a few taxa were marked by Fraser to replace types known to be lost or destroyed. Lectotypes are designated for 108 taxa.

INTRODUCTION

In 1963, the British Museum (Natural History) received the important collection of Odonata bequeathed by Lt.-Col. F. C. Fraser. Since this collection contained the types of nearly two-thirds of the species he had described, apart from those which he had already presented to the BM (NH), it seemed desirable to list those which are now there, as well as others which should have been in Fraser's collection but which have not as yet been traced.

In 1957 he deposited in the Department of Entomology the greater part of his Odonata types, on permanent loan during his lifetime, to become the property of the Museum on his death. This proved to be a fortunate decision, since in the course of arranging these types certain discrepancies in labelling (locality, date, etc.) came to notice, and it was then possible to consult Fraser on general details; these discussions proved valuable in dealing with problems which arose after the remainder of his bequest reached the Museum.

It may be thought strange that such inaccuracies should have occurred, but Fraser, as an officer in the Indian Army Medical Service, was naturally subject to posting from one place to another at intervals, and his entomological work was only a hobby. In 1939 his collection suffered a more serious disturbance when, as a wartime precaution, he unmounted and re-papered most of his type-specimens. After the war, many of these were again relaxed and re-pinned and Fraser agreed that errors of re-labelling had occurred in a number of cases during that period. Cases were also found where he had placed type-labels on specimens in his collection, although the actual types had already been presented to the BM (NH). Errors in locality labels were also discovered involving the types already presented to the BM (NH) by Fraser. Much of this material was in paper triangles when presented and errors have been due to faulty transcription of data written (not always very legibly) on the paper triangles. Where it is evident that such errors had occurred, new labels have been written, based upon the published data.

In common with other workers of his time, Fraser did not always mention or indicate a type-specimen in his earlier works. In preparing this paper, I have endeavoured to trace the first reference which can be taken as an indication or designation of a type-specimen, since the concept of lectotype was then unknown. For example, a statement such as " A pair in the British Museum, the male the type ", made subsequent to the presentation of the specimens to the BM (NH), has been accepted as equivalent to designation of lectotype and the requisite reference has been quoted after the word Lectotype. Where LECTOTYPE is used, it denotes present designation, and in the absence of evidence to the contrary, I have accepted the specimen marked Type by Fraser as lectotype.

A number of Fraser's types, originally deposited in the collection of the Department of Agriculture at Pusa, were subsequently given to the then Imperial Bureau of Entomology and presented by that body to the British Museum (Natural History). These are indicated as " Ex Pusa Collection ".

The recognition of the type-specimens of some taxa has been made difficult by the fact that, in some of Fraser's earlier species subsequently placed in synonymy, he apparently replaced the original determination labels with new ones, omitting any reference to the original name. Such types have in some cases only been recognizable by locality data or by some special individuality in structure.

In this paper, the names of the taxa of the species-group are listed alphabetically. Following the specific name is the original generic name and the reference by year and page. The status of the type is followed by the data on the various labels. In the case of manuscript labels, the authorship is indicated by initials as follows [label F.C.F.], [label D.E.K.] and [label T.B.F.], T. Bainbrigge Fletcher. Following the label data are any comments concerning these and finally the present status of the taxon, where it differs from the original combination. The names of taxa for which no types have been located in the Fraser collection are enclosed in square brackets.

LIST OF TYPES IN B.M. (N.H.)

abbreviata (ssp. of ***Rhinocypha biforata***), 1928 : 454. Holotype ♂. Rhinocypha delimbata abbreviata, Shillong, Assam, 1927, T. B. F. [label F.C.F.]. Now *Heliocypha biforata abbreviata* (Fraser).

aculeata (***Macromia***), 1927 : 68–69. Holotype ♂. M. aculeata, Maymyo, Upper Burma, 25.v.25, Col. F. Wall [label F.C.F.].

adami (***Ceylonosticta***), 1933 : 211, fig. 6. LECTOTYPE ♂. Type. C. adami, Madugoda, Ceylon, 5.v.32, F. C. Fraser [label F.C.F.]. Ceylonosticta adami

Fras. ♂, Lectotype, D. E. Kimmins det. 1964. Of the 7 ♂ and 1 ♀ syntypes listed, 6 ♂ and 1 ♀ have been traced. Now *Drepanosticta adami* (Fraser).

adami (***Libellago***), 1939 : 24, fig. 1. Holotype ♂. L. adami Fr., Haragama, Ceylon, 7.v.32, F. C. Fraser coll. [label F.C.F.].

adjuncta (race of ***Polythore derivata***), 1946 : 18, fig. 1c. LECTOTYPE ♂. Umbria, 19.xi.30. P. derivata race adjuncta [label F.C.F.]. Allotype ♀. Same locality, 23.xi.30.

africanus (***Echinopterogomphus***), 1926 : 356, figs. 1–2, (♂); 1928a : 130, fig. 4 (♀). Holotype ♂ [imperfect]. West Africa, Sierra Leone, Port Lokko, 1.v.1912, J. J. Simpson. Echinopterogomphus africanus Fraser. Type. [label F.C.F.]. Allotype ♀. Lestinogomphus africanus ♀ (Fraser), Uganda, Hale Carpenter [label F.C.F.]. Now *Lestinogomphus africanus* (Fraser).

albistigma (***Ischnura***), 1927a : 27–28, fig. 51. Holotype ♂. Ischnura albistigma Fras. ♂ (Type). Coll. P. A. Buxton, Malololelei, Upolu Is., W. Samoa, 7.xii.25 [label F.C.F.].

albistyla (***Gynacantha***), 1927 : 75–76. Lectotype ♂ (Fraser, 1936 : 113). Pusa, 5.ix.24, Fletcher coll., in verandah. Gynacantha albistyla Fraser ♂ (Type) [label F.C.F.]. Allotype ♀. Pusa, 14.viii.24. Fletcher coll. On ceiling of bungalow verandah. Gynacantha albistyla Fraser ♀ Allotype [label F.C.F.]. Both ex Pusa Collection. Fraser records a single pair in the Pusa Collection, with date 5.ix.24, but this is surely an error, as the label on which he wrote ♀ Allotype is clearly dated 14.viii.24. Now *Acanthagyna albistyla* (Fraser).

albofasciata (***Lestes***), 1943 : 113–115, figs. 1–2. Holotype ♂. Lestes albofasciata Fraser, ♂ Type. Buru. det. F. C. Fraser. [label F.C.F.]. The label bears a printed date 1957 [one of Fraser's blank determination labels] which probably is an indication of the year in which the specimen was relaxed and re-labelled.

ambigua (race of ***Polythore derivata***), 1946 : 19. LECTOTYPE ♂. Yumbatos, Peru, xi.32. P. derivata race ambigua [labels F.C.F.]. Allotype ♀. Same locality, x.32. P. derivata race ambigua [labels F.C.F.]. Specimens labelled Type and allotype by Fraser.

anascephala (***Drepanosticta***), 1933c : 114–115, fig. 2. Holotype ♂. Laos, Pu Tat. c. 1,200 m., in evergreen forest, 22.iv.1932, Dr. A. Kerr [label D.E.K.] Drepanosticta anascephala Fraser ♂ Type, D. E. Kimmins det. 1963. The specimen labelled Type in Fraser's pinned collection did not agree in either date or locality with the published description. The true type was located in his papered collection and now bears my determination label.

[***angularis*** (***Lestes***), 1929 : 848–849.] The type has not been traced. It is stated to have been in the Pusa Collection (L. Burma, Minbu, 8.viii.1914), but it was not listed amongst the Pusa types presented to the BM (NH).

annaimallaicus (race of ***Lamelligomphus nilgiriensis***), 1934 : 279, fig. 83b. LECTOTYPE ♂. Type. L. annaimallaicus, Mudis Hills, Coimbatore Dt, v.29,

F. C. Fraser coll. [label F.C.F.]. Fraser subsequently placed a type label on a ♀ from Munar, Travancore, 23.vi.31, S. India, F. C. Fraser [label F.C.F.] and this may be considered as allotype. It may be noted that the specific name is spelt " annamallaicus " in the original description but as it is spelt " annaimallaicus " in the legend of fig. 83b (two pages earlier), in the index and on the type label, the spelling over the original description should be considered as a printing error. Now *Onychogomphus nilgiriensis annaimallaicus* (Fraser).

annaimallaiensis (***Macromia***), 1931 : 452–453. Holotype ♂. Mudis Hills, 12.v.29, S. India, F. C. Fraser [label transcribed by D.E.K.]. M. annaimallaiensis ♂ [label F.C.F.]. Allotype ♀. M. annaimallaiensis ♀, Mudis Hills, 12.v.29. S. India, F. C. Fraser [label F.C.F.]. The holotype lacked a locality label when received from Fraser, though bearing type and determination labels, and as only two specimens were taken, the locality label was transcribed from that of the female.

annandalei (***Caconeura***), 1921 : 543. Lectotype ♂ (Fraser, 1924 : 503). India, Mahableshwar, 22.iv.1920, 4,500 ft., F. C. Fraser. Caconeura annandalei Fraser, Type-specimen [label F.C.F.]. Allotype ♀. Same data. Now *Prodasineura verticalis annandalei* (Fraser).

anomala (***Indolestes***), 1946a : 43–44, figs. 1c, 2e. Holotype ♂. Indolestes anomala Fraser, Dalat, Siam, 17.x.20, Type [label F.C.F.]. The locality given in the original description is Doun-moi, without date, but the specimen otherwise agrees. Now *Lestes* (*Indolestes*) *anomala* (Fraser).

antelopoides (***Protosticta***), 1931 : 467–468, figs. 5a–c. Holotype ♂. P. antelopoides, Munnar, W. Ghats, Travancore, 30.v.1931, F. C. Fraser [label F.C.F.]. Allotype ♀. Data as holotype. Protosticta antelopoides Fras., ♀, det. F. C. Fraser [2 labels D.E.K.]. This female is referred to as a paratype in the original description.

apiaensis (***Gynacantha***), 1927a : 35–36. Holotype ♂. G. apiaensis, Apia, W. Samoa, 16.iv.24, J. S. Armstrong [label F.C.F.]. Now *Acanthagyna apiaensis* (Fraser).

apicalis (***Chloroneura***), 1924 : 501–502, fig. 5. LECTOTYPE ♂. S. India, Coorg, Cauvery River, Fraserpet, 6.v.1923, Maj. F. C. Fraser. C. apicalis Fras. [label F.C.F.]. Allotype ♀. Coorg, 6.xi.23. Fraserpet, Cauvery. C. apicalis ♀ [label F.C.F.]. No types were specified in the original description nor in 1933b : 248–250. The above ♂ was sent to the BM (NH) as type. The allotype was so labelled by Fraser.

apicalis (***Gynacantha***), 1924a : 83. Holotype ♀. Lyallpur, Punjab, October 1921, Dutt coll. Gynacantha apicalis sp. nov. (Type) [label F.C.F.]. Gynacantha apicalis Fraser. Type ♀, Fraser det. 1922 [label F.C.F.]. Ex Pusa Collection. Now *Acanthagyna apicalis* (Fraser).

[***apicalis*** (ssp. of ***Hylaeothemis fruhstorferi***), 1924 : 430.] I have been unable to trace the types of this subspecies, unless the specimens in BM (NH), labelled as types, have been given incorrect locality data by Fraser. The status of this subspecies is uncertain, as Fraser himself omits any reference to it in Fauna of British India, 1936, but in 1946c : 99 he refers to it as " race *apicalis* " of *H. indica*. See also **indica,** (***Hylaeothemis***).

aquicola (***Agriogomphus***), 1943a : 165. Holotype ♂. Agriogomphus sylvicola Selys, Allotype ♂, Iquitos, Peru, 10.iii.31, det. F. C. Fraser, 1943 [label F.C.F.]. Agriogomphus aquicolor Fras., ♂ Type, D. E. Kimmins det. 1964. This name was proposed conditionally by Fraser, and since it is earlier than 1960 (Art. 15 of Intern. Code), it must be considered as an available name. Fraser (loc. cit.) writes " Mr. J. E. Roberts, who has seen this supposed male allotype of *Agriogomphus sylvicola* from Peru, expresses his opinion that it would not be safe to associate it with the female *A. sylvicola* in view of the differences of locality, and suggests that a name should be given to it, which may be confirmed in the future if the male should be found to belong to different species ; in adopting his advice, I suggest the name *Agriogomphus aquicola*." The specific name *aquicola* was included in the Zoological Record for 1943 as a new specific name and I have therefore placed my determination label on the specimen, so that it shall not be overlooked.

arachnoides (***Pseudocopera***), 1922 : 56, pl. 7, fig. 4. Holotype ♂. Margherita, 14–19.v.1920, Fletcher Coll. Margherita, 15.v.1920, Copera arachnoides Fraser, Type ♂ [labels T.B.F.]. Ex Pusa Collection. Syn. of *Platycnemis annulata* (Selys).

armageddoni (***Chlorocypha***), 1940 : 552, figs. 1, 3. LECTOTYPE ♂. East Africa, Buganda, 1927, G. Hale Carpenter. C. armageddoni, Type ♂ [label F.C.F.]. Allotype ♀. Same locality data. C. armageddoni, Allotype ♀ [label F.C.F.]. Syn. of *Platycypha lacustris* (Foerster).

armstrongi (***Amorphostigma***), 1925 : 433–434, fig. 3. LECTOTYPE ♂, allotype ♀. W. Samoa, Apia, 28.x.1923, J. S. Armstrong, ♂♀ in coitu. Amorphostigma armstrongi Fraser, Types.

armstrongi (ssp. of ***Rhyothemis regia***), 1956 : 328, fig. 5. This subspecific name was proposed by Fraser for *Rhyothemis regia exul* Ris ; Fraser, 1927. Fraser mentions no type specimens in his paper, nor have I found a specimen marked Type in his collection. I have therefore decided to designate as LECTOTYPE a ♂ from the Samoan Is., Tutuila Isl., Pago Pago, 2.xii.1924, *P. A. Buxton* and *G. H. Hopkins*, determined by Fraser as *Rhyothemis regia exul*. This specimen also bears Lieftinck's determination label *Rhyothemis regia chalcoptilon* (Brauer), of which species *R. r. armstrongi* Fraser has been placed as a synonym by Lieftinck. Syn. of *Rhyothemis regia chalcoptilon* (Brauer).

arthuri (***Mortonagrion***), 1942 : 97–98, figs. 1a, b. Holotype ♂. Malaya, Butterworth, 24.xi.1935, A. Wheeler. Mortonagrion arthuri sp. nov., ♂ Type. F. C. F.

asiatica (***Indophlebia***), 1935 : 323–324, fig. 2. Holotype ♀. Sikkim, Tonglu, 10,000 ft., 29.ix.1924. Indophlebia asiatica Fraser, Female Type.

[***assamica*** (***Enallagma***), 1919 : 877–878.] The type is stated by Fraser (1933b : 343) to be in the BM (NH), but there is no record here that it was ever received. There are no examples in the Fraser collection marked as type, or even bearing the date of the type series (27.x.1918), but there are examples taken at Shillong on other dates in October, 1918. This may be another instance where an error has occurred in the published date of capture. Fraser's description is not very detailed and differs somewhat from these examples, and whilst they may have been part of the type-series, it seems better to record the type as " untraced ". Syn. of *Aciagrion tillyardi* Laidlaw.

assamica (***Indolestes***), 1930 : 104. Holotype ♀. Type of Indolestes assamica Fras., Shillong, Assam, 27.x.1929. T. B. F. Symp. assamica ♀ (Fraser) [labels F.C.F.].

atrocyana (***Agrion***), 1935 : 330. LECTOTYPE ♂. Tonkin. Pseudomatrona atrocyana Fras., Mss., Type ♂ [label F.C.F.]. Agrion atrocyana Fras. ♂ Lectotype, D. E. Kimmins det. 1965. In his account of the species, Fraser mentions that he had provisionally named the species *Pseudomatrona atrocyana*, but later decided that it was not separable from *Agrion*. As a name published in synonymy, *Pseudomatrona* is not an available name. The remaining examples have been labelled paratypes.

attenuatum (***Aciagrion***), 1928a : 126–127. Holotype ♂. Africa, Nyasaland, Zomba, Colin Smee. Aciagrion attenuatum ♂ Fraser Type [labels D.E.K.]. Zomba, Nyassaland Protectorate, Coll. Mr. Colin Smee. Aciagrion attenuatum ♂ sp. nov. [labels F.C.F.].

atuberculata (***Macromia***), 1922 : 67–68. Holotype ♂. Hasimara, Duars, [Bengal], C. M. Inglis coll. 1920. Macromia atuberculata Fraser ♂, Type [label T.B.F.]. Ex Pusa Collection. Syn. of *Macromia flavocolorata* Fraser.

aurantiacum (***Ceriagrion***), 1924 : 492. LECTOTYPE ♂. Type. Nilgiris, 3,500 ft., Wynaad, 26.vii.1922. Ceriagrion auranticum Fras., ♂. Allotype ♀. Nilgiri Wynaad, Devarashola, 3,000 ft., 13.viii.1922, F. C. Fraser. C. aurantiacum ♀ allotype [label F.C.F.]. The specific name on the label of the lectotype is misspelt. Now *Ceriagrion olivaceum aurantiacum* Fraser.

auranticum (***Ceriagrion***), 1922a : 236–237. LECTOTYPE ♂. Bangkok, 20.viii.1921. Coll. Gen. E. W. Trotter. Ceriagrion auranticum ♂ [label on paper triangle, F.C.F.]. Of the three males listed by Fraser, this is the only example which I have been able to trace ; it was in his papered collection, without any type-label.

aurea (***Tetrathemis***), 1924a : 69–70, pl. 9, fig. 1. LECTOTYPE ♂. [L. Burma], Mergui, 28.ix.1922, Bott coll. Tetrathemis aurea ♂, Type. Fraser det. 1922 [labels F.C.F.]. Ex Pusa Collection. Syn. of *Tetrathemis platyptera* Selys.

auricolor (***Amorphostigma***), 1927a : 30–32, figs. 3c–d, 5iii. LECTOTYPE ♂. W. Samoa, Upolu, Malololelei, 14–30.vii.1925, J. S. Armstrong. Amorphostigma auricolor Fras. ♂ (Type) [label F.C.F.]. The remainder of the type series (1♂, 2♀) has not been traced.

auricolor (ssp. of **Caconeura dorsalis**), 1927 : 90. Holotype ♂. Upper Burma, Maymyo, 5.viii.1925, Col. F. Wall. C. dorsalis auricolor Fraser, ♂ Type [label F.C.F.]. Allotype ♀. Same data, Caconeura dorsalis auricolor Fraser ♀ [label D.E.K.]. Now *Prodasineura auricolor* (Fraser).

auricolor (**Gomphus**), 1926c : 482. Holotype ♀. Tonkin, Ngaio-Tio, 4,800 ft., 5.iv.1924, H. Stevens. Gomphus auricolor sp. nov. ♀, Type [label F.C.F.].

auricolor (var. of **Notiothemis jonesi**), 1944 : 40–42, fig. 2a. Holotype ♂. Notiothemis jonesi var. aureus Fras., Uganda, 3.xii.1927. Det. F. C. Fraser [label F.C.F.]. The name *aureus* on the label may be an error of transcription from the paper envelope.

autumnalis (**Caconeura**), 1922 : 43. Holotype ♂. Assam, Shillong, 14.x.1919, T. B. Fletcher. Caconeura autumnalis, Type [label T.B.F.]. Disparoneura autumnalis ♂. T. B. F., Shillong, 14.x.1919 [label F.C.F.]. Now *Prodasineura autumnalis* (Fraser).

azureum (**Aciagrion**), 1922 : 51. Holotype ♂. [Assam], Margherita, 18.v.1920, Fletcher coll. Aciagrion azureum sp. nov. [label F.C.F.]. Aciagrion azureum Fraser, ♂ Type, Fraser det. 1921 [label T.B.F.]. Ex Pusa Collection.

bainbriggei (**Gynacantha**), 1922 : 75–76. Holotype ♂. Gauhati, in bamboo jungle, 18.x.1919, Fletcher coll. Gynacantha bainbriggei Fraser, Type [labels T.B.F.]. The specimen is rather bleached, confirming that it is the type, which was a spirit specimen. Now *Acanthagyna bainbriggei* (Fraser).

bakeri (**Ceriagrion**), 1941 : 62–63, fig. B, 1. LECTOTYPE ♂. Uganda, Gulu, Patiko, 23.vii.1929, G. D. Hale Carpenter. Type of C. bakeri sp. n. [label F.C.F.].

beatifica (ssp. of **Rhinocypha perforata**), 1927 : 86–87, fig. 5. Lectotype ♂ (Fraser, 1934 : 45). R. perforata limbata, Mugba [Nungba], Naga Hills, 8.iv. 1924, Dr Annandale. R. perforata beatifica Fras. [labels F.C.F.]. Right hand wings missing. In 1927 : 87, Fraser says " one in my own collection, one in Pusa " and in 1934 he remarks " Type in Fraser collection ", which is equivalent to a designation of lectotype.

beesoni (**Rhinocypha**), 1922 : 61–63. Holotype ♂. R. beesoni, Lachiwala, Dehra Dun Dt, N. India, 18.xi.1920, F. C. Beeson [label F.C.F.]. Now *Heliocypha beesoni* (Fraser).

bellicosa (**Macromia**), 1924 : 453–454, pl. 25, fig. 9. Lectotype ♂ (Fraser, 1936 : 177). India, Coorg, Cannanore Ghat, 28.v.1923, Maj. F. C. Fraser. Macromia bellicosa ♂ Type [label F.C.F.].

bicolor (race of **Chlorocypha curta**), 1941a : 39. The position of this race-name is confused. Fraser refers to it as a " provisional Mss name " for a race of *curta*, which he distinguished by the paired black spots on abdominal segments 3 to 5 being confluent with the moderately broad apical black rings. Pinhey, 1962 : 148[1]

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[1] Pinhey, E. 1962. *Publ. cult. Cia Diamant. Angola*, **59**.

gives the locality as Bagang (Cameroons), but this is an error, since Fraser implies that the pair from this locality are typical of *curta*. As far as I know, Fraser never gave the locality of his race *bicolor*. There is in the BM (NH) a ♂ specimen from Uganda, which is marked by Fraser as *Chlorocypha bicolor* sp. n. Neither this nor two paratypes from Uganda agree with his diagnosis, all having the paired spots on segments 3–5 separated from the apical rings and appear to be normal *curta*. I propose therefore that *C. bicolor* Fraser, 1941 be placed as a synonym of *C. curta* (Selys), **syn. n.**

bicornutus (***Gomphus***), 1922 : 72–73. Holotype ♀. Shillong, 18.vi.1920, Fletcher coll. Hovering over stream. Gomphus bicornutus ♀ Type. Fraser det. 1921 [label T.B.F.]. Ex Pusa Collection. Now *Megalogomphus bicornutus* (Fraser).

bidentatum (***Ceriagrion***), 1941 : 64–66, fig. B, 3. Holotype ♂, allotype ♀. Uganda, Budama, x.1927, G. D. Hale Carpenter [label D.E.K.]. Ceriagrion bidentatum Fraser [label F.C.F.]. The locality written on the paper envelopes by Fraser was Entebbe, but the published locality was Budama.

bidentatus (***Leptogomphus***), 1930a : 752–753, 2 figs. LECTOTYPE ♂. Type. Leptogomphus bidentatus ♂, Shillong, Assam, 21.vii.28, T. B. F. [label F.C.F.]. Allotype ♀. Same data. Both specimens are labelled 21 instead of 19 July as published. Now *Dubitogomphus bidentatus* (Fraser).

bifenestrata (***Rhinocypha***), 1922 : 63, pl. 8, fig. 2. Holotype ♂. Mangpu [Darjiling Dt], 3,860 ft., 30.viii.1920, Rhinocypha bifenestrata Fraser, ♂ Type [label T.B.F.]. Ex Pusa Collection.

bifida (***Tetrathemis***), 1941b : 138–140, figs. 1–3. LECTOTYPE ♂. Uganda, Bwamba Valley, Kidongo, 6.i.1928, G. Hale Carpenter [label D.E.K.]. Tetrathemis bifida Fras., ♂ [label F.C.F.]. The published date of capture is 7.i.1928.

biguttata (***Cephalaeschna***), 1935 : 321–322. Holotype ♂. C. assamica, Shillong, Assam, 18.v.1924, T. B. Fletcher [label F.C.F.]. This specimen agrees with the diagnosis of *biguttata* and I believe that Fraser changed the name of this species before publication and did not correct the label. I consider it to be the holotype of *C. biguttata*.

biharica (***Gynacantha***), 1927 : 74–75. Holotype ♂. India, Bihar, Pusa, 7.viii. 1924, T. B. Fletcher. Gynacantha biharica Fraser sp. n. ♂. Ex Pusa Collection. Now *Acanthagyna biharica* (Fraser).

bilineata (***Melanoneura***), 1922 : 55. Holotype ♀. Sidapur, Coorg, 25.iv.1919, Y. R. Rao coll. Melanoneura bilineata ♀ Type, F. C. F. det. 1921. Ex Pusa Collection. It should be noted that there are a few discrepancies between this specimen and the description. Firstly, it is a female, as labelled by Fraser, not a male as in the description. Secondly the abdomen, lacking the last four segments, measures 30 mm., not 23 mm., and thirdly, Fraser does not mention the transverse blue band on the face. I consider it to be conspecific with later material placed by Fraser as *M. bilineata*. There is in the BM (NH) a further complete ♀ taken by

Fraser at Coorg, which has been labelled by him as cotype. This is incorrect, as the species was based upon a single example.

[***binocellata*** (***Agriocnemis***), 1922a : 233]. Location of unique type ♂ not stated. Not traced in Fraser Collection, where types of two of the five species described in this paper have been located.

binocellata (***Macromia***), 1924 : 451–452. When checking the Fraser types deposited at the BM (NH) in 1958, I discovered that the specimens labelled as ♂ and ♀ types of *M. binocellata* were in fact the types of *Epophthalmia frontalis malabarensis* Fraser, a species synonymous with *M. binocellata*. In answer to my query about this, Fraser wrote me (1.ii.1958) " Inglis [the collector] was essentially an ornithologist and his only collections were on my behalf, with the proviso that duplicates and types should be reserved for the [Darjeeling] Museum. He is dead now and when he left Darjeeling to settle in the Nilgiris in 1936, he sent me one type in fragmentary condition and said that his assistant had apparently not looked at the collections for some time as clothes moths and anthrenids had got at them and they were all in bits and pieces."

Fraser then suggested that a Malabar specimen of *M. frontalis malabarensis* be selected as Neotype of *M. binocellata* and sent me a printed label to be attached to the specimen in question. This label was based upon his mistaken belief that the International Code required that the neotype be deposited in the original museum (a policy to which he was strongly opposed). Since this is not the case there was no point in retaining the whole of his label and it has been cut down to " Type destroyed. Neotype " and supplemented by a label in my handwriting. I take this opportunity of publishing Fraser's selection of a NEOTYPE for *M. binocellata* Fraser.

Epophthalmia frontalis malabarensis Fraser has since 1936 been considered a synonym of *E. frontalis binocellata* Fraser and the selection of the type of *malabarensis* as the neotype of *binocellata* will maintain this usage. A full diagnosis of the subspecies is given in Fraser, 1936 : 199–201, fig. 62.

The labels on the NEOTYPE are : E. binocellata ♂, Waliyar Gt, S. Malabar, 11.ix.32, F. C. Fraser [label F.C.F.]. Epophthalmia frontalis malabarensis Fras., ♂ Type, det. D. E. Kimmins, 1958. Selected by Fraser, 1958 as NEOTYPE of Macromia binocellata Fraser [label D.E.K.]. Type destroyed. Neotype. Now *Epophthalmia frontalis binocellata* (Fraser).

bispina (***Macromia***), 1954 : 49–52, fig. 2 (5). Holotype ♂. Bwamba Forest, 2,400 ft., Fort Portal, Uganda, iv.1951, E. Pinhey. Type of Macromia bispina Fraser ♂ [label F.C.F.]. Allotype ♀. M. bispina Fras., ♀, Sango Bay, Katera, Uganda, x.1953. E. Pinhey.

borikhanensis (***Macrogomphus***), 1933c : 136–139, figs. 8a, c. LECTOTYPE ♂, allotype ♀. M. borikhanensis, Borikhane, Laos, Siam, 27.iii.32, Coll. A. Kerr [label F.C.F.].

botti (***Caconeura***), 1922 : 41–42. Holotype ♂. King Island, Mergui, Burma, 4.vi.1921, Bott coll. Caconeura botti Fras. ♂ Type. Fraser det. 1924 [labels T.B.F.]. Syn. of *Prodasineura collaris* (Selys).

burliyarensis (ssp. of ***Idionyx corona***), 1922 : 65; 1924 : 461–462, pl. 26, fig. 6. LECTOTYPE ♀. S. India, Burliyar, 29.viii.1921, 2,520 ft., Maj. F. C. Fraser. Idionyx corona race nilgiriensis Fraser ♀ Type [label F.C.F.]. Idionyx corona burliyarensis Fraser ♀ Type, det. D. E. Kimmins. Allotype ♂. I. burliyarensis ♂, Burliyar R., Nilgiris, 2,500 ft., 16.vi.22 [label F.C.F.]. It may be pointed out that Fraser (1936 : 229) refers to " Type and allotype female in the British Museum ". This is an error, since the type must be a female. (See also ***nilgiriensis***).

burmanensis (ssp. of ***Caconeura verticalis***), 1933b : 216–218. LECTOTYPE ♂. Upper Burma, Maymyo, 11–20.vi.1925, coll. F. Wall. Caconeura verticalis burmanensis Fras. ♂ [label F.C.F.]. No mention is made of types in original description. This lectotype agrees with the brief locality data. Now *Prodasineura verticalis burmanensis* (Fraser).

burmicus (***Microgomphus***), 1925a : 854. LECTOTYPE ♂. Type. Microgomphus burmicus ♂, Maymyo, Upper Burma, 10.vi.24, F. Wall [label F.C.F.]. Allotype ♀. Microgomphus burmicus ♀ Maymyo, 10.vi.24, F. Wall [label F.C.F.]. Syn. of *Microgomphus loogali* Fraser.

butoloensis (***Notogomphus***), 1952 : 854. Holotype ♂. N. butoloensis ♂, sp. n., Bwamba Valley, Uganda, 2,500 ft., 8.xii.1928, A. O. Fisher [label F.C.F.]. Allotype ♀. Butolo Forest, 30 m. W. of Kampala, May 1951, E. Pinhey. Allotype, Notogomphus butoloensis Fras. ♀ [label E. Pinhey].

buxtoni (***Ischnura***), 1927a : 23–24, figs. 3a, b, 5v. LECTOTYPE ♂, allotype ♀, W. Samoa, Upolu Is., Malololelei, 2,000 ft., 2.vii.1924, J. S. Armstrong. Fraser appears to have erred in transcribing the locality data. Two females in paper envelopes in his collection bear data agreeing with that published in the original description. The ♂ type in BM (NH) was correctly attributed to J. S. Armstrong, but the date was given as 6.xii.26, not 2.vii.24. The female type also had the wrong date and the collector's name was given as P. A. Buxton. I have therefore removed our museum locality labels (based upon Fraser's transcriptions) and replaced them with labels agreeing with the descriptions. Fraser's labels have been retained.

cacharensis (ssp. of ***Disparoneura campioni***), 1933b : 244. Holotype ♂. Cachar, Assam, 5.ix.1921, coll. B. Antram. Disparoneura campioni cacharensis Fras, ♂ Type [labels F.C.F.]. Now *Elattoneura campioni cacharensis* (Fraser).

cacharicus (***Lamellogomphus***), 1924a : 81–83. Holotype ♀. Dilkoosh, Cachar, ix.21. Lamellogomphus cacharicus Fraser, ♀ Type, Fraser det. 1924. Gomphus sp. nov. Fraser det. 1922 [labels T.B.F.]. Ex Pusa Collection. The data given in the original description had been transcribed as July. Now *Onychogomphus cacharicus* (Fraser).

***calcipennis* (*Microstigma*)**, 1946 : 463, fig. 3f. Holotype ♀. Microstigma calcipennis Fraser ♀ Type. Bolivia, F. C. Fraser det. 1946 [label F.C.F.].

***campioni* (*Disparoneura*)**, 1922 : 43–44. Holotype ♂. Margherita, 18.v.1920, Disparoneura campioni Fras. ♂ Type. Fras. det. 1921 [label T.B.F.]. Ex Pusa Collection. Now *Elattoneura campioni* (Fraser).

***campioni* (*Orogomphus*)**, 1924 : 467–469. Lectotype ♂ (Fraser, 1929a : 149). S. India, Coorg, 4 mls from Mercara, 2.v.23, coll. F. C. Fraser [label F.C.F.]. Orogomphus campioni Fras. ♂ Type, D. E. Kimmins det. 1964. Allotype ♀. S. India, Coorg, Mercara, Sidapur Rd, 2.v.23, Maj. F. C. Fraser [printed label], Orogomphus campioni ♀, Mercara, Sidapur Rd, Coorg, 2.v.23, coll. F. C. Fraser, Cotype [label F.C.F.]. The original description does not state the sex of the type and cotype but Fraser, 1929a : 149 states " Coll. Br. Mus., 1 ♂ (type), 1 ♀ (cotype)". Now *Chlorogomphus campioni* (Fraser).

***canningi* (*Caconeura*)**, 1919 : 877. Holotype ♂ (lacking abdominal segments 7–10). Nilgiris, Coonoor, 6,000 ft., Caconeura canningi sp. nov., Type, F. C. F. [label F.C.F.]. Fraser (1924 : 504) casts doubt on the accuracy of the locality label of the type and suggests that it may really have been collected in Ceylon, Dyatalawa, 5,000 ft. Syn. of *Prodasineura sita* (Kirby), a Ceylanese species.

***cardinalis* (*Oxyagrion*)**, 1946 : 41–42. Holotype ♀. Type, Oxyagrion cardinalis ♀, Mishuyacu, Peru, 14.iv.30 [label F.C.F., on back of mounting card].

***cardinalis* (*Pseudophaea*)**, 1924 : 512–513. Holotype ♂. S. India, Shambanagur, Madura. P. cardinalis Fraser, the upper specimen the type [label F.C.F., in pencil]. Fraser omits any details as to the location of the type in the original description, probably due to an uncorrected printing error. The BM (NH) has in fact a type and two paratypes, all with locality labels as detailed above, presented by S. Maulik, as part of a collection of undetermined insects from S. India. Fraser studied these insects in our collection and made them part of his type-series, placing the pencil-written determination label below them. This label was subsequently placed on the upper specimen and the other two labelled as paratypes, either by Campion or myself. In the circumstances I think it is justifiable to regard this type as holotype rather than lectotype. Now *Indophaea cardinalis* (Fraser).

***carpenteri* (*Nilogomphus*)**, 1928a : 133, figs. 5a–d. LECTOTYPE ♂. Notogomphus dorsalis ♂, Bududiri, Mt. Elgon, 4,200 ft., 20.xii.1927, H. Carpenter. [label F.C.F.]. Uganda, Gulu Dt, W. Nile, viii.ix.1927, G. Hale Carpenter. Nilogomphus carpenteri, ♂ Type Fraser, D. E. Kimmins det. 1965 [labels D.E.K.]. Allotype ♀. Same data. No specimens labelled as *Nilogomphus carpenteri* have been located either in Fraser's collection, in the BM (NH) or in the Hope Department, University Museum, Oxford. The Fraser collection does however contain a pair labelled *Notogomphus dorsalis* (Selys), a species with which Fraser subsequently synonymized his *Nilogomphus carpenteri*. These examples differ slightly in nodal indices from the original description, the locality and date also disagree and the ♂ superior anal appendages are slightly crumpled, compared with the original figures. I consider this to be another case in which Fraser has re-labelled his types and in so doing has given them incorrect locality labels. I am therefore accepting them as the types and have re-labelled them as above. Now syn. of *Notogomphus dorsalis* (Selys).

carpenteri (***Oxythemis***), 1944a : 85–87, figs. 1a, b. LECTOTYPE ♂. Type. Uganda, White Nile, R. Alla, 27.ix.27, G. D. H. Carpenter. Oxythemis carpenteri Fraser ♂ [label F.C.F.]. Allotype ♀. Same data. Now *Aethiothemis carpenteri* (Fraser).

carpenteri (***Tetrathemis***), 1941b : 140–141, figs. 7, 8. Holotype ♂. Uganda, Entebbe, vii.1921 [label D.E.K.]. Tetrathemis carpenteri Fras. ♂ Type. F. C. Fraser det. Syn. of *Tetrathemis polleni* (Selys).

caudalis (***Anisogomphus***), 1926a : 423. Holotype ♂. Assam, 5,000 ft., Shillong, 18 June 1924, Fletcher coll. Anisogomphus caudalis Fraser ♂ Type [label T.B.F.]. Allotype ♀. A. caudalis, Barog, 5,000 ft., Simla Hills, 4.viii.29, Capt. Cardew [label F.C.F.].

cauvericus (***Burmagomphus***), 1926a : 413. Holotype ♂. S. India, Coorg, Bhagmandala Rd, 3.vi.1923, Maj. F. C. Fraser. Burmagomphus cauvericus Fras. ♂ Type [label F.C.F.].

cerinostigma (***Protosticta***), 1924 : 499–500. There is a discrepancy between the published locality data and that on the holotype specimen, although it is possible that the two sets of data may be complementary to one another and refer to the same locality. The published locality is Nilgiris, Ochterlony Valley, 3.viii.1922. The data on the paper envelope (by rubber stamp) are Nilgiris, 3,500 ft., Wynaad, Pandy R., 2.viii.1922, F. C. F. Protosticta cerinostigma ♂ Fras. Type [label F.C.F.], with additional comment (in pencil) var. of sanguinostigma. Now var. of *Protosticta sanguinostigma* Fraser.

cervus (***Heliogomphus***), 1942a : 336–337, figs. 1 (3, 6), 2 (14). LECTOTYPE ♂. Upper Burma, Maymyo, 4.vii.25, F. Wall coll., Heliogomphus ♂, with on reverse, H. cervus (Type) [label F.C.F.]. Allotype ♀. Same data.

chichibui (***Gomphus***), 1936b : 148–149, fig. 1. Holotype ♂. Japan, Nikko, June '34, Coll. F. C. Fraser. G. chichibui ♂. Syn. of *Trigomphus interruptus* (Selys).

clauseni (***Agriocnemis***), 1922 : 53–55, pl. 6, fig. 4. Holotype ♂. Shillong, Fruit Gdn Pond, 2.ix.1919. Fletcher coll. Agriocnemis clauseni ♂ Type, Fraser det. 1921 [label T.B.F.].

coerulescens (***Caconeura***), 1932 : 289–291. LECTOTYPE ♂. P[eninsular] Siam, Prachuap Province, Pak Tawan, 2.viii.1931, Dr A. F. G. Kerr [label D.E.K.]. Caconeura dorsalis group, Ab entirely absent, C. coerulescens ♂ Type [label F.C.F.]. Allotype ♀. Same data. Caconeura coerulescens Fraser allotype. Now *Prodasineura coerulescens* (Fraser).

cordosa (ssp. of ***Chlorocypha dispar***), 1947 : 23. Holotype ♂. Gabon. Libellago cyanifrons Selys ♂ [Selys label]. Chlorocypha rubida Hag., D. E. Kimmins det. 1948. Chlorocypha dispar cordosa Fraser, ♂ Type, D. E. Kimmins det. 1963. Now syn. of *Chlorocypha dispar* (P. de B.).

corona (***Idionyx***), 1921a : 690. Holotype ♀. Babuddin Hills, Mysore, 1.vi.1915. Ramakrishna coll. Idionyx corona ♀ Type, Fraser det. May 1921 [label T.B.F.]. Ex Pusa Collection. The type lacks abdominal segments 6–10.

coryndoni (***Lokia***), 1952a : 249—250, fig. 2d. LECTOTYPE ♂. Uganda, Entebbe, Lake Victoria, x.1952. Lokia n. sp. ♂ ♀ [label F.C.F.]. Lokia coryndoni Fraser ♂, D. E. Kimmins det. Allotype ♀. Same locality, v.52. Lokia coryndoni Fraser ♀, D. E. Kimmins det.

cupricincta (***Macromia***), 1924a : 74. Holotype ♂. Burma, Thaton distr., Mokpalin, 18.v.23, Bott coll. Shady jungle path, hawking low, 11.30 a.m., 18.v.23 [label T.B.F.]. Macromia cupricincta Fras. ♂ Type [label T.B.F.]. Ex Pusa Collection. Allotype ♀. Assam, Nowgong, 2.vi.31, C. Antram. M. cupricincta.

cupricolor (***Hemicordulia***), 1927a : 37–39, fig. 4. LECTOTYPE ♂. W. Samoa, Upolu Is., Malololelei, 2.vii.1924, J. S. Armstrong, Hemicordulia cupricolor. Allotype ♀. Same data.

curiosa (***Protosticta***), 1934a : 134–135, fig. 1. Holotype ♂. Burma, Mergui, 31.v.32 [Dr A. Kerr]. P. curiosa Fras. ♂ Type [label F.C.F.].

cyaneovittata (***Esme***), 1922 : 45–46. Lectotype ♂ (Fraser, 1933b : 264). Palnis, 7,000 ft., Kodaikanal, 29.viii.1921, Fletcher coll. No type was selected by Fraser. This may be taken as type [label T.B.F.]. Esme cyaneovittata ♂ Fraser [label T.B.F.].

cyaneofrons (***Gomphus***), 1923 : 62. This name first appeared in a key to Indian Dragonflies and there is no indication that it was a new species nor is any precise locality mentioned. Apart from a similar key later in the same volume, no further reference is made to this name by Fraser. Laidlaw placed it as a synonym of *Perissogomphus stevensi* Laidlaw, 1922.

There are no examples labelled *Gomphus cyaneofrons* in the Fraser collection, but there are other instances in which he has removed his original determination labels when a species has been synonymized and replaced them with new determination labels. Concerning this first key, the following extract from a letter by Fraser to Dr F. F. Laidlaw (19.xi.1929) is of interest. He writes " I would not regard ' Dragonfly Collecting in India ' too seriously, as it was written rather hurriedly to order and is what I called ' The Young Dragonfly Collector '. When writing it, I had a number of undescribed species and wishing to make the key as complete as possible, I named these provisionally and included them. I ought, of course, to have conserved these names when publishing descriptions later. The article, however, was never intended as a scientific paper and so I never regarded it at all seriously." This statement of Fraser's does not affect the availability of the specific names published in this key (Art. 8 of Int. Code), as there was no published indication that it was not intended as a scientific publication.

In Fraser's Gomphidae collection are 1 ♂ and 3 ♀ of *Perissogomphus stevensi* Laidlaw, with dates of capture which would entitle them to consideration as possible syntypes of *Gomphus cyaneofrons* Fraser (Bengal, Gopaldhara, 4.vi.1919, *H. Stevens*). I have therefore placed labels on them to that effect, in case at any time it is desired to designate a lectotype for *Gomphus cyaneofrons* Fraser. Now syn. of *Perissogomphus stevensi* Laidlaw.

[***dabreui*** (***Agriocnemis***), 1919a : 454.] The location of the holotype ♀ is not given in the original description. In 1933 : 398, the type is stated to be in BM (NH), formerly in Pusa Collection. This species is however not listed amongst the types received from Pusa in 1925 and the type is probably no longer in existence.

davenporti (***Ceylonolestes***), 1930 : 96–97, pl. 1, fig. 7. Syntypes, 4 ♂, 2 ♀, Palni Hills, 7,000 ft., T. B. Fletcher coll., various dates, 14.viii.1920–vii.1923. No type has been selected for this species and it seems better to leave such selection until a specialist is making a revision. It may be pointed out that in the original description, the species is attributed to Ris. Now *Lestes* (*Indolestes*) *davenporti* (Fraser).

davenporti (***Protosticta***), 1931a : 70–71, pl. figs. 9, 10; 1931 : 467 (♀). Holotype ♂. S. India, Mudis Hills, 29.v.1929, F. C. Fraser [label D.E.K.]. Protosticta davenporti Fras., ♂ [label F.C.F.]. Allotype ♀. Munnar Ghat, Travancore, 25.v.1932. P. davenporti Fras. ♀ allotype, det. F. C. Fraser [label F.C.F.]. The manuscript label on the holotype appears to have been marked Type, but most of it has been cut off, leaving only the top of the " T ".

davina (ssp. of ***Zygonyx iris***), 1926 : 768–769. The holotype ♀ has been destroyed by pests in the Darjeeling Museum. The following specimen, with data " Z. davina, Kurseong, Sikkim, vi.39 " from Fraser's collection, was selected by him as typical and was regarded by him as a neotype, though he did not publish the designation. As it is desirable that there should be authentic material for this subspecies, I take this opportunity of designating the above specimen in BM (NH) as NEOTYPE ♀ of *Zygonyx iris davina* Fraser, 1926. See ***binocellata, Macromia.***

decoloratum (***Libyagrion***), 1928a : 126. LECTOTYPE ♂. Africa, Nyasaland, Zomba, Colin Smee [label D.E.K.]. Zomba, Nyassaland Protectorate, coll. Colin Smee. Libyagrion decoloratum Fraser ♂ Typel [abels F.C.F.]. Libyagrion decoloratum Fraser ♂ Type [label D.E.K.]. Allotype ♀. Africa, Nyasaland, Zomba, Colin Smee [label D.E.K.]. Libyagrion decoloratum gen et sp. nov. [label F.C.F.]. Libyagrion decoloratum Fras. ♀ allotype [label D.E.K.]. Now syn. of *Enallagma* (*Africallagma*) *subtile* Ris.

delineatus (ssp. of ***Davidius zallorensis***), 1926d : 166, pl. 1, fig. 4, text-figs. 3, iii, viii. LECTOTYPE ♂. India, Darjeeling Distr., Gangtok, 16.v.25, C. M. Inglis. Davidius zallorensis delineatus Fras., ♂ Type [label F.C.F].

denticauda (***Tetrathemis***), 1954a : 255–257, figs. 1a, b. Holotype ♂. Uganda, Bunyoro distr., Ft. Portal, G. H. Carpenter [label D.E.K.]. Tetrathemis denticauda Fraser ♂ [label F.C.F.].

descendens (ssp. of ***Acanthagrion apicale***), 1946 : 38–40, figs. 9a, 10, 4. Holotype ♂. Acanthagrion descendens Fras., ♂ Holotype, Mishuyacu, Peru, 2.vii.30. From Leeds Mus. Coll. [writing F.C.F., on underside of staging card].

[***diminutivus*** (***Onychogomphus***), 1924b : 109–110, pl. 1, fig. 1.] The type of this species has not been traced in the Fraser Collection.

dingavani (***Onychogomphus***), 1924c : 1005–1006, pl. 2, fig. 7, text-fig. 2, vii. Holotype ♂. Onychogomphus dingavani ♂, [Kalaw] Siam Rd, S. Shan States, 3,000 ft., 20.x.22, Type. Capt. Dingavan coll. [label F.C.F.].

disarmatus (***Lestes***), 1961 : 11–12, fig. 1. Holotype ♂. Madi Opei, Acholi, Uganda, iii.52. T. H. E. Jackson. Lestes disarmata sp. nov. Holotype.

dobsoni (***Agriocnemis***), 1954b : 147–148, figs. 1a, b, c. LECTOTYPE ♂. A. dobsoni Fras., Innisfail, N. Queensland, 22.ix.52, coll. R. Dobson, F. C. Fraser det. 1953 [label F.C.F.].

dolorosa (***Pacificagrion***), 1953 : 119–120, figs. 2, 3, 8, 9, 12, 14, 16, 17. Holotype ♂. P. dolorosa Fras. ♂ Type. Hellsoi's Paddock, 1,600 ft., Apia, J. S. Armstrong [label F.C.F.].

donaldi (***Anaciaeschna***), 1922b : 482–483, 699–700. Lectotype ♀ (Fraser, 1924 : 465). Kodaikanal, Palni Hills, S. India. Coll. F. C. Fraser, May 1908 (Original specimen) [typewritten label]. Anaciaeschna donaldi Fraser ♀. Lectotype ♀ Fraser, 1924 [label D.E.K.]. Allotype ♂. On road side. Anaciaeschna donaldi Fraser, ♂. Varatapari, Annaimallai Hills, S. India, 25.iv.1933. det. F.C. Fraser. vide E. m. M. 76 : 88 [label F.C.F.]. The specimen in Fraser's collection labelled " A. donaldi Fraser ♀ Type " was not one of the syntypes, since it was dated 21.v.22. Amongst his examples of *A. martini*, with which *donaldi* was once synonymized, I found a ♀ with locality label agreeing with the first example listed by Fraser (1922b) and marked by him " Original specimen ". In 1924 : 465, Fraser makes the following statements concerning *A. donaldi* " described originally from a female from the Palni Hills " and " The original female, rather dilapidated, is in my collection, and was taken by myself in the Palni Hills, May 1908 ". I have accepted these two remarks as being the equivalent of a lectotype designation by Fraser. His collection also contained two other females (which had been relabelled as *A. martini* by Fraser) which may be part of the type-series of *A. donaldi*.

donaldi (***Indomacromia***), 1924 : 515–516, fig. 6. Holotype ♂. Macromidia donaldi ♂, Sampaji Ghat, Coorg, 7.vi.24, (Type) Coll. F. C. Fraser [label F.C.F.]. Allotype ♀. Macromidia donaldi ♀. Tamaracherry, S. Malabar, nr Calicut, 15.vii.28. Coll. F. C. Fraser [label F.C.F.]. Now *Macromidia donaldi* (Fraser).

dorothea (ssp. of ***Agrionoptera insignis***), 1927 : 65–66. Lectotype ♂ (Fraser, 1936 : 277). India, Bengal, Duars, Hasimara, 1924, H. V. O'Donel [label D.E.K.]. A. insignis dorothea Fraser, ♂ Type, det. F. C. Fraser [label F.C.F.].

dorothea (***Lestes***), 1924 : 484–485, pl. 26, fig. 8. Holotype ♂. S. India, Coorg, Mercara, 17.iv.1923, Maj. F. C. Fraser. Lestes praemorsa dorothea ♂ [label F.C.F.]. Allotype ♀. S. India, Coorg, Greenfield, Mercara, 26.iv.1923, Maj. F. C. Fraser. L. praemorsa dorothea ♀ [label F.C.F.]. The ♂ type was presented to the BM (NH) in 1923 and thus qualifies for the status Holotype by Fraser's statement in original description " Types in B.M.". Another specimen in BM (NH), ex Pusa Collection, from Kurseong, Lestes dorothea Fraser ♂ Type, was incorrectly labelled by T. Bainbrigge Fletcher and is in fact a paratype of *Indolestes helena* Fraser.

drummondi (***Lamellogomphus***), 1924c : 985–986. Holotype ♀. L. risi ♀ = (G. drummondi Fras. Type), Siam Road, Loimwe, S. Shan States, 3,000 ft., 17.v.1923, Capt. Drummond [label F.C.F.]. Now syn. of *Onychogomphus risi* (Fraser).

duarensis (***Burmagomphus***), 1922c : 421–422, pl. 11, fig. 7. Holotype ♂. India, Hasimara, Duars, Maj. F. C. Fraser. Burmagomphus duarensis Fras. ♂. Coll. H. V. O'Donel, Hasimara, Duars, Type [label F.C.F.]. The printed label incorrectly quotes Fraser as the captor. Now syn. of *Merogomphus martini* (Fraser).

duaricus (***Onychogomphus***), 1924c : 1001–1003, pl. 2, fig. 5. Holotype ♂. Onychogomphus duaricus ♂, Hasimara, Duars, Bengal, 9.vii.20, H. V. O'D[onel] [label F.C.F.]. Allotype ♀. Same data. Although it is stated in the original description " Type male and cotype female in the British Museum ", these specimens in fact remained in Fraser's collection until 1957.

dubia (***Porpacithemis***), 1954a : 261–262, figs. 2a–d. Holotype ♀. Gabon, L. Asebbe, Fernan-Vaz, 14.i.1908. Porpacithemis dubia Fraser, D. E. Kimmins det. 1955.

dundomajoricus (***Phyllogomphus***), 1957 : 24–28, figs. 2c, g, 4a, 5c, 7c. LECTOTYPE ♂. N. Angola, Lundu Province, Dundo, 11.xii.1947. Phyllogomphus dundomajoricus ♂ Type, det. F. C. Fraser 1957. Allotype ♀. Same locality, xi.1948. Phyllogomphus dundomajoricus ♀ Allotype, det. F. C. Fraser, 1957.

dundominusculus (***Phyllogomphus***), 1957 : 28–29, figs. 2h, 4b, 5f. Holotype ♂. N. Angola, Lunda Province, Dundo, Nov. 1948. Phyllogomphus dundominusculus ♂ Type, det. F. C. Fraser, 1957.

echinoccipitalis (***Onychogomphus***), 1922 : 74–75. Holotype ♀. Dipping over roadside stream, Mile 23, Gauhati-Shillong. About 1,000 ft., 2.viii.19. Fletcher coll. (Gomphinae). Onychogomphus echinoccipitalis Fraser Type. Fraser det. 1921 [labels T.B.F.]. Ex Pusa Collection.

ellisoni (***Macromia***), 1924 : 457–458, pl. 25, fig. 3. Lectotype ♂ (Fraser, 1936 : 171). M. ellisoni ♂, 4,000 ft., Nilgiris, 7.x.21, Mysore Ditch, S. India, F. C. Fraser [label F.C.F.]. Allotype ♀. M. ellisoni ♀, Devalashola, Nilgiri Wynaad, 5.xi. 1922, S. India, F. C. Fraser [label D.E.K.]. When received from Fraser, the allotype bore a label stating that it was a ♂, from Gudapur.

eltoni (***Phyllothemis***), 1935 : 890–891. This is yet another species in which one finds discrepancies between the published data and the specimens. Fraser, in his description, records two males in his collection (King Island, Mergui, Lower Burma, taken by Mr J. Elton Bott during September), and states that the type is in his own collection. I have so far traced only one fragmentary ♂ in the Fraser collection. It was in a paper triangle ; the covering envelope was labelled *Phyllothemis eltoni* Type by Fraser but the triangle was labelled *Amphithemis gomphoides*.

In 1925 the BM (NH) received, amongst other Odonata types from the Pusa Collection, a specimen from Mergui, Bott coll., labelled by T. B. Fletcher *Amphithemis gomphoides* ♂ Fraser, Type, Fraser det. 1922. I think that the most probable explanation is that Fraser drew up a description of *Amphithemis gomphoides* from Pusa material submitted to him by Fletcher, but did not immediately send it to press. Years later, when assembling material for the third volume of the Odonata of the Fauna of British India, he used this description, publishing it under the name *Phyllothemis eltoni*. Similar discrepancies between labels and published names have been found in the Pusa material. Whether there were more than the two specimens I do not know, but I have discovered only this fragmentary one in the Fraser collection.

In view of the fragmentary condition of this specimen, and the fact that the Pusa male has been in the BM (NH) for forty years as the type of a Fraser Mss name, I designate the Pusa male as the LECTOTYPE of *Phyllothemis eltoni* Fraser, and it now bears my determination label to that effect. The fragmentary male has been labelled by me as a paratype.

ethelae (***Dysphaea***), 1924 : 480–482. Holotype ♂. S. India, Coorg, Napoklu, Cauvery River, 22.iv.1923, Maj. F. C. Fraser. Pseudophaea etheli ♂ Fras. MS., Cauvery River, Coorg, Napoklu, 22.4.23. Type [label F.C.F.]. Allotype ♀. S. India, Coorg, Fraserpet, near Cauvery River, 22.v.23, Maj. F. C. Fraser. Dysphaea ethelae Cotype ♀ [label F.C.F.]. The original description and Fauna of Brit. India give the specific name as *ethela*.

euphorbia (ssp. of ***Argia extranea***), 1946 : 457–458, figs. 2e–g. Holotype ♂. Type. Argia extranea euphorbia ♂. Mishuyacu, Peru, 10.viii.30 [label F.C.F., on underside of mounting card].

excelsa (***Orolestes***), 1933d : 181–182, pl. 4, fig. 3, text-fig. 5. Holotype ♂. Orolestes excelsa, Chaiyabari, N. E. Siam, 3.v.32, Dr A. Kerr [label F.C.F.]. One pair of wings in Ann Arbor Mus., Michigan. The right hand pair of wings was presented to Ann Arbor Museum by Fraser.

extraordinata (***Atoconeura***), 1950 : 56–57, fig. 1. LECTOTYPE ♂. Uganda, Ruwenzori, Bwamba Valley, 6,500–7,500 ft., 13–15.i.1926, G. D. Hale Carpenter [label D.E.K.]. Atoconeura extraordinata Fraser ♂ Type (A. eudoxia (Kirby)) F. C. Fraser det. 1951 [label F.C.F.]. Now syn. of *Atoconeura eudoxia* Kirby.

flaviceps (***Burmargiolestes***), 1933a : 120–121. LECTOTYPE ♂. B. flaviceps

Fraser ♂ Type. Taweing, Laos, 1,200 m., 6.iv.32, Dr A. Kerr [label F.C.F.]. ?Syn. of *Burmargiolestes melanothorax* (Selys).

***flavicolor* (*Heterogomphus*)**, 1923a : 678, pl. 1, figs. 2, 2a. Holotype ♀. Ex Mackenzie coll. Sine loco. (in box labelled " Saran ".) Heterogomphus flavicolor Fras. Fraser det. 1923. Type [labels T.B.F.]. Ex Pusa Collection. Now *Megalogomphus flavicolor* (Fraser).

***flavifrons* (*Notogomphus*)**, 1952 : 8–10, figs. 1c, 4a, b, e. LECTOTYPE ♂. Type. Mafuga Rain Forest, Kigezi, Uganda, 7,500–8,000 ft., June 1951, T. H. E. Jackson. Notogomphus flavifrons Fraser. Mafuga Forest, Kigezi, Uganda, vi.51. det. F. C. Fraser. Allotype ♀. Notogomphus flavifrons Fraser, Mafuga Forest, Kigezi, Uganda, vi.51. det. F. C. Fraser.

***flavocolorata* (*Macromia*)**, 1922b : 702, fig. 2. Holotype ♀. Macromia flavocolorata ♀, Hasimara, Duars, Bengal, 20.x.21, H. V. O'Donel. Type [label F.C.F.]. Allotype ♂. M. flavocolorata. Hasimara T. E., Duars, Bengal, 7.viii.31, H. V. O'Donel [label F.C.F.].

***flavovittata* (*Macromia*)**, 1935 : 326–328, figs. 4–5. Holotype ♂. M. flavovittata ♂, Moungpu, Darjeeling distr., 29.v.27 [label F.C.F.].

***fletcheri* (*Disparoneura*)**, 1919 : 876. Holotype ♂. Assam, Shillong, 22.ix.1918, Fletcher coll. D. fletcheri ♂, Fras. Type specimen [label F.C.F.]. Allotype ♀. Same locality, 20.ix.1918, Disparoneura fletcheri ♀, Fraser, Type specimen [label F.C.F.]. Now syn. of *Elattoneura atkinsoni* (Selys).

***fletcheri* (*Gomphidia*)**, 1923a : 669–670, pl. 2, figs. 2, 2a, text-fig. 2a. LECTOTYPE ♂. S. India, Coorg, Hallery, Mercara, 4,000 ft., 14.vi.23, Maj. F. C. Fraser. Shot down with dust-shot. F. C. Fraser. Gomphidia fletcheri ♂ [labels F.C.F.].

***fletcheri* (*Petaliaeschna*)**, 1927 : 73–74. The holotype ♂ was originally in the Pusa Collection, but there is no record of its having been received at BM (NH) with the other Pusa types in 1925 and it is now presumed lost. Fraser marked a replacement specimen in his own collection as neotype, but did not publish its establishment. I therefore designate this specimen as NEOTYPE ♂. The data are P. fletcheri, Shillong, Shillong, Assam, 21.v.24. T. Fletcher [label F.C.F]. Type destroyed. Neotype. Petaliaeschna fletcheri ♂ Fraser, det. D. E. Kimmins, 1964. NEOTYPE.

floridense (ssp. of ***Acanthagrion gracile***), 1946 : 37–38, figs. 8a, 10 (2, 3). Holotype ♂. Acanthagrion gracile floridense ♂ Type. S. E. Colombia, Florida, 7.ii.1931 [written on mounting card, F.C.F.].

folia (ssp. of ***Cordulegaster brevistigma***), 1929a : 120–121, pl. 12, figs. 11–12. Holotype ♂. Naini Tal, Kumaon, W. Himalayas, c. 7,000 ft., 5.vi.93 [label F.C.F.]. Cordulegaster brevistigma folia Fras. ♂, Type, D. E. Kimmins det., 1963. Allotype ♀. C. brevistigma, Naini Tal, N. W. Himalayas, c. 7,000 ft., 5.vi.93 [label F.C.F.]. Cordulegaster brevistigma folia Fras. ♀ Allotype. D. E. Kimmins det. 1963.

forficula (ssp. of ***Argia extranea***), 1946 : 456–457, figs. 1d–e. LECTOTYPE ♂. Argia extranea forficula ♂ Type. Rio Paranapura, Balsapuerto, 220 m., ii.1933. N. Peru, F. C. F. det. [written on underside of mounting card, F.C.F.].

fujiacus (***Gomphus***), 1936b : 147–148, fig. 7. Holotype ♂. G. fujiacus ♂ Type. Nikko, Japan, vi.34, coll. F. C. F. [label F.C.F.].

fujiama (***Davidius***), 1936b : 150–151, fig. 2. The Fraser collection contained no example identified as *Davidius fujiama*. Examination of his series of *Davidius cuniculus* Ris however revealed a single ♂ without either locality or determination labels, which agreed entirely with the description of *D. fujiama* and it has therefore been labelled as the LECTOTYPE ♂, with data as given in the description, (Japan, Nikko, 3.vi.1934, F. C. Fraser). Fraser's notes on *D. cuniculus* list 4 ♀ from Nikko ; his collection however contained 5 ♀, one of which had a label which was apparently of a later date than the others (the writing being larger and rather shaky). This ♀ appears to be *cuniculus* Ris, but I believe that it is the ♀ originally associated by Fraser with *fujiama* and that he later decided it was incorrectly named and changed the label. I have labelled it as the probable allotype of *D. fujiama*.

fulvia (ssp. of ***Idionyx corona***), 1924 : 515–517. Two specimens, 1 ♂, 1 ♀, have been located in the Fraser collection, labelled *I. burliyarensis fulvia*, Sampaji Ghat, Coorg, 18.v.1924. Since the description of this subspecies appeared in an appendix published in September 1924, these specimens can be considered as SYNTYPES. Fraser subsequently placed this subspecies as a synonym of *I. burliyarensis* and on the envelope of the ♂ the name *fulvia* is in much more faded ink than the name *I. burliyarensis*. Now syn. of *Idionyx burliyarensis* Fraser.

galeata (***Idionyx***), 1924 : 517–519, fig. 8a. LECTOTYPE ♂. S. India, Coorg, Khatlkad, 3,800 ft., 30.v.1924, Maj. F. C. Fraser. I. galeata Fras. ♂ [label F.C.F.]. Allotype ♀. India, Katlkad, Coorg, 4.v.23, F. C. Fraser. I. galeata Fras. Type [label F.C.F.]. The information about the types in the original description is confused. Fraser writes " The types were taken on Katlkad Estate near Mercara, 17.v.24 by myself. Two more also females were taken on the following day at the same place . . . A fourth female was taken on 25.v.24 . . . Two males, the first taken by myself, were captured on 30.v.24."

After much consideration I think that there is an error in the first two sentences, which I suggest should read " The types were taken by myself on Katlkad Estate, near Mercara; one female on 17.v.24 and two more, also females, on the following day at the same place . . ." This gives four females and two males as syntypes, all from Katlkad. Coming now to the existing material, there are two males and one female from Katlkad. One of the males was presented to BM (NH) in 1925 as the ♂ type. A female presented at the same time, marked allotype, is from Kudremukh, 22.v.24, C. A. Souter, and I consider that Fraser's statement excludes it from the syntypes. The only remaining ♀ syntype is marked Type and bears the date 4.v.23, which I believe to be a relabelling error. I consider this to be the allotype.

gardneri (**Hylaeothemis**), 1927 : 66–67. The holotype was originally in the Museum of the Forest Research Institute, Dehra Dun, N. India and was presented to the BM (NH) in 1949. The locality label of the type differs from that quoted in the original description (Kampison, Himalayas), being Naga Hills, 6,000 ft., Assam, S. N. Chatterjee, 8.iv.1924. Hylaeothemis gardneri Fras. Major Fraser det. Type ♂. The holotype now lacks its head.

gautama (**Indagrion**), 1922 : 50. Holotype ♀. Sadiya, 23 May 1920. Indagrion gautama Fras. ♀ Type. Fraser det. 1921 [label T.B.F.]. Indagrion gen. nov. gautama sp. nov. ♀ [label F.C.F.]. Now *Mortonagrion gautama* (Fraser).

gigantica (**Anotogaster**), 1924e : 48–49. Lectotype ♂ (Fraser, 1929a : 94–95). A. gigantica, Siam Rd, Kalaw, Burma, 8.ix.23. Capt. Drummond [label F.C.F.]. Type. Anotogaster gigantica Fras. Male. Siam Rd, S. Shan States, Burma. Coll. Capt. Drummond, 8.ix.23 [typewritten label]. Allotype ♀. A. giganticum. Kalaw, Burma, 20.ix.23. Capt. Drummond [label F.C.F.]. Allotype. Anotogaster gigantica Fras. Female. Kalaw, S. Shan States, Burma. Coll. Capt. Drummond, 20.ix.23 [typewritten label.].

gloriosa (**Dysphaea**), 1938 : 197–198. Holotype ♂. D. gloriosa. Pak Tawan, Prachaup, Siam, 21.viii.31. Dr A. Kerr [label F.C.F.]. Allotype ♀. D. gloriosa, Muang Ban, Laos, Siam, 28.iv.32. Dr A. Kerr coll. [label D.E.K.].

gracillima (**Hemicordulia**), 1944a : 87–88, fig. 1c. Holotype ♀. Malaya, Kuala Lumpur, 26.iii.32, H. M. Pendlebury. At light. H. gracillima Fras. Holotype [label F.C.F.].

gynostylus (**Cyclogomphus**), 1926d : 162–163. Holotype ♂. Ceylon, Kandy Lake, 4.ix.24, Col. F. Wall. C. gynostylus [label F.C.F.]. Allotype ♀. C. gynostylus Allotype ♀. Kandy, Ceylon, v.1911 [label F.C.F.].

haemastigma (**Ischnura**), 1927a : 26–27, figs. 2a, b, 5, vi. Holotype ♂. Samoan Is., Upolu Is., Malololelei, 5.xii.1925. P. A. Buxton & G. H. Hopkins. Ischnura haemastigma Fraser ♂. Malololelei, Upolu Is., W. Samoa, coll. P. A. Buxton, 5.xii.1925. Type [label F.C.F.].

[**haematoneura** (**Sympetrum**), 1924a : 70–71.] Type not yet traced. Originally in Pusa Collection but not listed amongst those presented to BM (NH) in 1925, and it is therefore presumed lost.

halei (**Macromia**), 1928a : 137. LECTOTYPE ♀. Uganda, L. Victoria, Entebbe, xi.1927, G. D. Hale Carpenter. Macromia halei sp. nov. ♀ [label F.C.F.]. Syn. of *Macromia nyanzana* Grünberg.

hamulata (**Argia**), 1946 : 447–449, fig. 2d. Holotype ♂. S. America, Peru, Yumbatos, xi.1932. Argia hamulata n. sp. ♂ Type [label F.C.F.].

hannyngtoni (**Heterogomphus**), 1923a : 674–676, pl. 1, figs. 1, 1a, text-fig. 4. Holotype ♂. S. India, Coorg, Bhagmandala Rd, 5.vi.1923, Maj. F. C. Fraser. Heterogomphus hannyngtoni Fras. ms. ♂, Bhagmandala Rd, Coorg. Type [label F.C.F.]. Allotype ♀. M. hannyngtoni Fras. ♀. Napoklu, Coorg, 2.v.24. Coll. F. C. Fraser. F. C. Fraser det., 1924 [label F.C.F.]. Now *Megalogomphus hannyngtoni* (Fraser).

hanumana (***Gynacantha***), 1922 : 76–77. Holotype ♂. Mangpu, 5,200 ft., 18.ii.1920. C. M. Inglis. Gynacantha hanumana, Fraser, Type [labels T.B.F.]. Ex Pusa Collection. Syn. of *Acanthagyna subinterrupta* (Rambur).

hasimaricus (***Burmagomphus***), 1926a : 411. LECTOTYPE ♂. Burmagomphus hasimaricus ♂, Hasimara, Duars, Bengal, 5.vi.23, coll. H. V. O'Donel, 5.vi.23. Allotype ♀. Burmagomphus hasimaricus ♀, H. V. O'Donel, Duars, Bengal [label F.C.F.]. The reverse of the lectotype's label is inscribed Burmagomphus biharicus, H. V. O'Donel, 21.vii.23, Duars, N. I., Type.

hearseyi (***Protosticta***), 1922d : 5, pl. 1, figs. 3–4. Lectotype ♂ (Fraser, 1933b : 115). Madras, Gudalur, Nilgiri Hills, 26.vi.21, 4,500 ft., Maj. F. C. Fraser. Protosticta hearseyi ♂ Fraser [label F.C.F.]. Allotype ♀. Same locality, 26.vi. 21. Both the lectotype and allotype bore incorrect date labels, which have been corrected.

helena (***Indolestes***), 1922 : 60–61, pl. 7, fig. 1. Holotype ♂. Kurseong, 6,000 ft., 27.ix.20. C. M. Inglis coll. Sympecmoides sp. nov. ♂, Fraser det. 1921. Indolestes helena Fraser ♂ Type. Fraser det. 1921. [labels T.B.F.]. Ex Pusa Collection. The type now lacks segments 9–10 of abdomen. Syn. of *Indolestes cyaneus* (Selys).

hemihyalina (ssp. of ***Rhinocypha quadrimaculata***), 1922 : 64, pl. 8, fig. 5. Holotype ♂. Khasi Hills, Shillong, 16.x.1919, Fletcher coll. B. H. ♂, 16.x.19. Rhinocypha hemihyalina Fraser ms. ♂ Type. Fraser det. 1921 [label T.B.F.]. Penis drawn, J. Cowley, Aug. 1935. Allotype ♀. Same locality and date. Rhinocypha hemihyalina Fraser ms. ♀ Cotype, Fraser det. 1921 [label T.B.F.]. Ex Pusa Collection.

hermionae (***Allogaster***), 1927 : 76–77. Holotype ♂. India, Bengal, Darjeeling Distr., [Senchal, 8,000 ft.] 3.vi.26, C. M. Inglis. Allogaster hermione Fraser ♂ Type. The date of capture is given as July in original description. Now *Neallogaster hermionae* (Fraser).

hetaerinoides (***Leucopteryx***), 1933c : 125–128, figs. 5–6. LECTOTYPE ♂. Laos, Muang Cha, 1,100 m., 10.iv.1932, A. Kerr. Leucopteryx hetaerinoides Fras. [label F.C.F.]. Allotype ♀. Archineura hetaerinoides, Muang Cha, Laos, Siam, 10.iv.32, Dr A. Kerr [label F.C.F.]. Now *Archineura hetaerinoides* (Fraser).

hilaryae (***Rhinocypha***), 1927 : 83–86, fig. 4. Lectotype ♂ (Fraser, 1934 : 39). Burma, Maymyo, vii.1924. Col. F. Wall. Rhinocypha hilaryae Fraser ♂ [label F.C.F.]. Allotype ♀. Burma, Maymyo, vii.1924. Col. F. Wall. Rhinocypha hilaryae Fras. ♀ Allotype [label F.C.F.]. The printed locality labels on type and allotype were incorrect in date and collector's name and have been replaced. Now *Aristocypha hilaryae* (Fraser).

hincksi (***Mnesarete***), 1946 : 26–28, fig. 2. Holotype ♂. S. E. Colombia, Umbria, 6.i.1931. Mnesarete hincksi Fraser ♂ Type. det. F. C. Fraser. 1945. In the original description the generic name was mis-spelt *Mnesarte.*

huallaga (***Argia***), 1946 : 450–451, fig. 2a. LECTOTYPE ♂. Peru, Huallaga region, Balsapuerte, x.1932, G. Klug. Argia huallaga n. sp. ♂ Type, det. F. C. Fraser [label F.C.F.]. Allotype ♀. Locality and date as for lectotype ♂. Argia huallaga n. sp. ♀ Allotype [label F.C.F.]. The locality given by Fraser is not correct. The part of the paper triangles upon which he wrote his determinations gives the locality as Balsapuerte, not Yumbatos, and the labels have been amended accordingly.

huonensis (***Anaciaeschna***), 1926c : 473. Holotype ♂. Germ. New Guinea, Huon Gulf, W. Potter. Gabmetzung, 20 miles up Markham River, 29.ii.1920. Anaciaeschna huonensis sp. nov. ♂ Type [label F.C.F.].

icteroptera (***Mnais***), 1929b : 592–593. Holotype ♂. Mnais icteroptera ♂, Kalaw, Chin Hills, Burma. Type [label F.C.F.].

ida (***Macromia***), 1924 : 449–450, pl. 25, fig. 4. Lectotype ♂ (Fraser, 1936 : 190). India, Gudalur, Nilgiris, 3,500 ft., 20.ix.1922, F. C. Fraser. Macromia ida Fras. ms. ♂ Type [label F.C.F.]. Allotype ♀. India, Gudalur, ix.1922, F. C. Fraser. Macromia ida Fraser ♀, det. F. C. Fraser [labels D.E.K.].

imbricata (***Idionyx***), 1926e : 205–206, pl. 9, fig. 4, pl. 10, fig. 1. Holotype ♂. Assam, 5,000 ft., Shillong, 8.vi.1924, Fletcher coll. Idionyx imbricata, Fraser ♂. Type [label T.B.F.]. Ex Pusa Collection.

immaculata (***Zygonyx***), 1933c : 134–135. Syntypes, 2 ♂. Z. immaculata. Pak Muang, Laos, ca 600 m., 24.iv.32, A. Kerr. Z. immaculata. Hat Kam, Laos, Wiangchan, 28.iv.1932, A. Kerr [labels F.C.F.]. Fraser did not mark either of the two males of the type series as types and they are therefore left as Syntypes, pending a revision of the genus.

incisura (***Gynacantha***), 1935 : 325–326, fig. 3. Holotype ♂. G. incisura. Loimwe, S. Shan States, 5,600 ft., Burma, 25.ix.23. Type. [label F.C.F.]. Now *Acanthagyna incisura* (Fraser).

indica (***Hylaeothemis***), 1946c : 97–100, figs. 1–3. LECTOTYPE ♀. Hylaeothemis fruhstorferi ♀ Nilgiris, June 1919, Type, F. C. Fraser [label F.C.F.]. Hylaeothemis indica Fraser ♀ Type, D. E. Kimmins det. 1964. Allotype ♂. Same locality, Hylaeothemis indica Fraser ♂ Allotype, D. E. Kimmins det. 1964. These two specimens have been in BM (NH) over the label *fruhstorferi* since 1920, and at a later date Fraser wrote Type (in red ink) on the label of the female, but he omitted to put a determination label on either specimen. This was probably about the time that he described *indica.* I have therefore labelled the specimens as types of *H. indica* Fraser. The situation is still obscure, as in his description he refers to the " form *apicalis* Fraser ", which he considered as synonymous with the new species *indica. H. apicalis* Fraser, 1924, however was described as a subspecies of *H. fruhstorferi* and the name *apicalis* therefore has priority over *H. indica*, and the species should be quoted as *Hylaeothemis apicalis* Fraser. Syn. of *Hylaeothemis apicalis* Fraser.

***indica* (*Indolestes*)**, 1922 : 58–60. Holotype ♂. Khasi Hills, Shillong, 20.ix.1919. Fletcher coll. BL ♂, Shillong, 20.x.19. Indolestes indica ♂ Type Fraser, Fraser det. 1921 [labels T.B.F.]. Ex Pusa Collection. The co-type ♀ was not received from the Pusa Collection.

***indica* (*Macromia*)**, 1924 : 448–449, pl. 25, fig. 5. Holotype ♂. India, Gudalur, Nilgiris, 3,500′, 14.ix.1922. Maj. F. C. Fraser. Macromia indica Fras. Ms. ♂ Type [label F.C.F.].

indica (ssp. of ***Micromerus lineatus***), 1928 : 686–687, pl. 1, fig. 5 and pl. 3, fig. 2. Holotype ♂. India, Poona, vi.1917, F. C. Fraser. M. lineatus ♂♀, Poona, June '17 [label F.C.F.]. Micromerus lineatus indica Fras. ♂ Type, D. E. Kimmins det. Allotype ♀. India, Poona, vi.1917, F. C. Fraser. Micromerus lineatus indica ♀ Allotype, D. E. Kimmins det. Now *Libellago lineata indica* (Fraser).

***indicum* (*Pseudagrion*)**, 1924 : 495–497, figs. 3i, ii, iv, v. Holotype ♂. India, Nilgiri Nadgani, 24.viii.1922, F. C. Fraser. Pseudagrion indicum Fras. ♂ Type [label F.C.F.]. The locality should be Nilgiri Wynaad, Nadgani. Fraser records types in BM (NH) but only the above specimen was presented before his collection was received here. Fig. 127a (1933b) gives a poor impression of the bifid superior appendage of the male.

***inflata* (*Ceylonolestes*)**, 1933b : 67–68, fig. 30. Holotype ♂. Ceylonolestes inflata Fras. ♂, Maymyo, N. Shan Sts, 5.vi.25, F. Wall. Sympycna assamica ♂ Fras. [labels F.C.F.]. Now *Indolestes inflata* (Fraser).

***infrequentula* (*Argia*)**, 1946 : 451–452, figs. 2h, 7d. LECTOTYPE ♂. S. America. S. E. Colombia: Umbria, 12.xii.1930. Pres. by Leeds City Mus. Argia infrequentula ♂ Type [label F.C.F.]. Allotype ♀. Same data, except date, 25.xi.1930. The date on the holotype is an error for 12.xi.1930.

[***infumata*** (var. of ***Mecistogaster linearis***), 1936 : 462.] No examples of this female variety with " evenly and rather deeply enfumed " wings have been traced in the Fraser collection, nor were any included in the types of new species presented by the Leeds City Museum. This varietal name was proposed provisionally by Fraser, but under the International Code (Art. 17, (8), (9)), the name is available should it at any time be considered desirable to elevate the form to sub-specific rank.

***inglisi* (*Lamellogomphus*)**, 1924c : 984–985, pl. 1, fig. 2. Lectotype ♂ (Fraser, 1934 : 275). Lamelligomphus inglisi ♂, Mangpu, Darjeeling, C. M. Inglis, 29.ix.23 [label F.C.F.]. Lamellogomphus inglisi Fraser. ♂ Type, D. E. Kimmins det. 1963. Allotype ♀. Lamelligomphus risi ♀, Riyang R., Mangpu, Darjeeling Dt, 23.ix.23 [label F.C.F.]. Lamellogomphus inglisi Fraser ♀ allotype, D. E. Kimmins det. 1963. Both locality labels differ in date from that given in the original description (17.v.23), and the ♀ is clearly an example of the re-labelling that

Fraser occasionally did when a species became a synonym. Syn. of *Onychogomphus risi* (Fraser).

inglisi (***Stylogomphus***), 1922 : 70–71, pl. 7, figs. 3, 3a–b. Holotype ♂. Teesta River, 8 June 1920, C. M. Inglis coll. Stylogomphus inglisi Fraser ♂ Type [labels T.B.F.]. Ex Pusa Collection.

intermedia (***Protorthemis***), 1936c : 700–701, 1 fig. Holotype ♂. Protorthemis intermedia Fras. ♂ Type, Palawan [on reverse of label, F.C.F.].

interrupta (***Agriocnemis***), 1927a : 22, figs. 1c, d; 1953 : 125–126. Holotype ♂. W. Samoa, Upolu Is., Malololelei, 2.vii.1924, J. S. Armstrong. Agriocnemis interrupta Fraser, ♂, det. F. C. Fraser. Allotype ♀. A. interrupta Fras. ♀, A. Grey's Reach, Vasigano River, 1,900′, 5.i.1952, J. S. Armstrong [label F.C.F.].

intricata (***Idionyx***), 1926 : 201–202, pl. 8, fig. 6. Lectotype ♂ (Fraser, 1936 : 237). Type. I. intricata ♂, Cherrapunji, Assam, 6,000′, 15.vii–30.viii.23. T. B. Fletcher. det. F. C. Fraser [label F.C.F.]. Allotype ♀. I. intricata ♀, Tura, Garo Hills, Assam, 3,500–4,000′, 15.vii–30.viii.23, T. B. Fletcher. det. F. C. Fraser [label F.C.F.].

irata (***Macromia***), 1924 : 454–455, pl. 25, fig. 6. LECTOTYPE ♂. S. India, Coorg, Bhagmandala Rd, 3.vi.1923, Maj. F. C. Fraser. Macromia irata ♂ Type [label F.C.F.]. Allotype ♀. M. irata ♀. Napoklu Rd, Coorg. Shot down. 18.v.1924. S. India. F. C. Fraser [label F.C.F.]. The phrase " Shot down " indicates that it was captured by shooting with a dust-shot cartridge.

[***irma*** (***Megalestes***), 1926f : 32–33.] The Fraser collection contained 3 ♂, 1 ♀ with data agreeing with the types and to 1 ♂, 1 ♀ of which he had attached type-labels. These cannot however be the types, which were placed in the Darjeeling Museum where, according to a letter from Fraser (see under ***binocellata***, p. 183) they were destroyed by insect pests. The ♂, in addition, has the abdomen 5 mm. shorter than the measurement given for the type. In my opinion these should all be considered as paratypes, though eligible for designation as a neotype should such action be deemed necessary.

isa (ssp. of ***Zygonyx iris***), 1926 : 767–768. Holotype ♂. Z. isa ♂. Maymyo, N. Shan States, U. Burma, coll. F. Wall. 19.vi.24 [label F.C.F.]. This subspecies appears to have been based upon a single specimen, which is thus the holotype.

isis (***Zygonyx***), 1924 : 440–441. Holotype ♂. S. India, Coorg, Fraserpet, 14.ix. 1923, Maj. F. C. Fraser. Z. isis ♂, Fras. Type [label F.C.F.]. Now *Zygonyx torrida isis* Fraser.

kalarensis (***Heliogomphus***), 1934 : 329–330, fig. 101b; 1942a : 340. Holotype ♂. Heliogomphus kallarensis, Kallar, 1,500′, Nilgiris, March 1916, S. India. F. C. Fraser [label F.C.F.]. Allotype ♀. H. kalarensis ♀, Kotagiri Ghat, Nilgiris, S. India, 9.vii.33, F. C. Fraser coll. [label F.C.F.]. The specific name and locality are spelt with double " ll " on the holotype label.

kerri (***Amphithemis***), 1933c : 130–133, fig. 8. LECTOTYPE ♂. Type F. C. F. Laos, Taweing, 500 m., 4.iv.1932, A. Kerr [label D.E.K.]. Hylaeoth. kerri ♂.

[with " Amphi " written below in pencil, label F.C.F.]. Allotype ♀. Laos, Muang Baw, 27.iv.1932, A. Kerr [label D.E.K.]. Allotype. A. kerri ♀ [labels F.C.F.]. The specimens were received from Fraser without locality labels and the above labels have been transcribed from the original description.

kerri (**Macrogomphus**), 1932 : 286–287, figs. 1a, b. Holotype ♂. M. kerri ♂. Pak Tawan, Pran River, Prachaup Province, N. Siam, 1.viii.31, Coll. A. Kerr [label F.C.F.]. The original description gives the country as P. Siam.

kerri (**Onychogomphus**), 1933c : 141. LECTOTYPE ♂. Onychogomphus saundersi kerri ♂. Dawn Ton, N. E. Siam, Dr A. Kerr, 15.v.32, Type ♂ [label F.C.F.]. This species is briefly described as *O. kerri* from two examples (one of which has been traced in the Fraser collection), in the discussion of a female of *O. saundersi* Selys ?, giving characters by which it may be distinguished from *saundersi*, but without locality data.

kerri (race of **Rhinocypha iridea**), 1933c : 121–122, fig. 4b. Holotype ♂. R. iridea kerri, Muang Awm, Laos, ca 900 m., 7.iv.32, (Type), Dr A. Kerr coll. [label F.C.F.]. Now *Aristocypha iridea kerri* (Fraser).

kimminsi (**Chlorogomphus**), 1940a : 55–56, fig. 1. Holotype ♂. Pulo Nias. Chlorogomphus kimminsi ♂ Fraser [label D.E.K.]. Allotype ♀. Pulo Nias. Chlorogomphus kimminsi ♀ Fraser [label D.E.K.]. Fraser has incorrectly interpreted the locality label as Nias Island, Pulo. Pulo is Malay for " island ".

kimminsi (**Macromia**), 1954 : 63–64, figs. 2, 6, 7. Holotype ♂. W. Africa, Sierra Leone, Kaballa, 29.v.1912, J. J. Simpson. M. kimminsi Fraser ♂, Type. F. C. Fraser det. 1953 [label F.C.F.].

klossi (**Anotogaster**), 1919b : 456–457, pl. 1. Holotype ♀. South Annam [label D.E.K.]. *Dran.* Eyes green, fore body yellow and black, after body tawny and black, base of wings deep yellow. Anotogaster klossi Fraser sp. nov. Anotogaster klossi Fraser ♀, sp. nov. [label F.C.F.]. The specimen had at some time lost its locality label and BM Register label and these have been replaced.

kodaguensis (**Gomphidia**), 1923a : 671–672. Holotype ♂. S. India, Coorg, Bettagiri, 7.v.1924, Maj. F. C. Fraser. G. kodaguensis Fras. ♂. Type F. C. F. [labels F.C.F.].

krishna (**Aciagrion**), 1921 : 543. No specimens labelled *krishna* were found in Fraser's collection but 3 ♂ were located in an envelope labelled " Mahableshwar, Aciagrion hisopa race ". The dates fell within the limits of Fraser's visit to this locality (20 April–1 May 1920) ; it may be mentioned that in the original description the date is given as 23rd May ; this should obviously have been 23rd April. These three males have been labelled as Syntypes.

kumaonensis (**Davidius**), 1926d : 170–171, pl. 1, fig. 6. LECTOTYPE ♀. Assam, Kumaon, 7,000 ft., v.1923. T. B. Fletcher [label D.E.K.]. Davidius kumaonensis [label F.C.F.]. This specimen has at some time lost its BM Register number label. I have been unable to trace it in the Departmental Register and it has therefore been re-registered as B.M. 1924–536. The type had also been given an incorrect locality label by Fraser (Kurseong, Sikkim, iv.32 instead of Kumaon, Assam, v.23) and this has been corrected.

***lachrymosa* (*Pacificagrion*)**, 1926g : 505–507, pl. 49; 1953 : 120–122, fig. 1. Holotype ♂. W. Samoa, Upolu Is., Malololelei, 3.vii.1924, J. S. Armstrong. Pacificagrion lachrymosa Fras. ♂ Type. Upolu Is., Malololelei, 3.vii.24. F. C. Fraser det. 1924 [label F.C.F.]. Allotype ♀. P. lachrymosa Fras. ♀, Fuluason R., above Mooris Dam, 7.x.41, J. S. Armstrong coll. F. C. Fraser det. 1952 [label F.C.F.].

***laidlawi* (*Burmagomphus*)**, 1924 : 475–476. Holotype ♀. Burmagomphus laidlawi ♀, Gudalur, Nilgiris, Pandy R., 8.vii.21 [label F.C.F.]. Allotype ♂. B. laidlawi Fras., Nilgiri Wynaad, 3,500′, 13.viii.22, F. C. Fraser coll. [label F.C.F.]. Originally described as *Gomphus* sp., Fraser, 1922c : 419.

***laidlawi* (*Idionyx*)**, Holotype ♀. Malay Penin.; Pahang, F.M.S., Frasers Hill, 4,200′, 2.viii.1932; on reverse, H. M. Pendlebury, F.M.S. Museum. Idionyx laidlawi Fr. Type ♀ [label F.C.F.].

[***laidlawi* (*Pseudagrion*)**, 1922 : 48–50.] Type (originally stated to be in Fraser's collection and later (1933b : 296) in BM (NH)) has not yet been traced.

***laidlawi* (*Rhinocypha*)**, 1924 : 482–483, 519–520; 1928 : 457–458, pl. 2, fig. 3. Lectotype ♂ (Fraser, 1934 : 55). S. India, Coorg-Kanara, 9.xi.1923, Maj. F. C. Fraser. Rhinocypha laidlawi Type ♂ [label F.C.F.]. Allotype ♀. C. laidlawi, Sampaji Ghat, Coorg, 500 ft., 18.i.24, S. India, F. C. Fraser [label F.C.F.]. The type ♂ was presented to BM (NH) in 1927. Now *Calocypha laidlawi* (Fraser).

***lankanensis* (*Ceylonosticta*)**, 1931a : 335, pl. 2, figs. 11–12; 1933 : 220–222, fig. 12. Holotype ♂. Ceylon. Yerbury. Kottawa, 19.iv.92. Ceylonosticta lankanensis Fraser ♂ Type, det. D. E. Kimmins, 23.xii.1931. Allotype ♀. P. lankanensis. 4 miles above Belihul Oya, Ceylon. 11.v.32. F. C. Fraser [label F.C.F.]. Now *Drepanosticta lankanensis* (Fraser).

***laosica* (*Calopteryx*)**, 1933c : 128–129. Holotype ♂. A. laosica. Muang Cha, Laos, Siam, 1,100 m., 17.iv.32, Dr A. Kerr [label F.C.F.]. Now *Agrion laosica* (Fraser).

***leoni* (*Phyllomacromia*)**, 1928a : 138. Holotype ♀. P. leoni ♀. Yegi, Volta R., Gold Coast, W. Africa, 13–14.xi.26, H. Hargreaves. M. leoni (Fras.) ♀. F. C. Fraser det. 1953 [labels F.C.F.]. Syn. of *Macromia bifasciata* (Martin).

[***leucostigma* (*Disparoneura*)**, 1933e : 225–226.] The original description states " Type and allotype female in Colombo Museum ", and a footnote adds " The type, in accordance with the usual custom of the Colombo Museum, will be presented to the British Museum on publication of this paper ". This does not appear to have been done. The Fraser collection contains a pair from the type series which should be considered as paratypes. Now *Elattoneura leucostigma* (Fraser).

libyana (***Gynacantha***), 1928a : 136. Holotype ♂. H. libyana (Fras.), Lake Victoria, Entebbe, Uganda, G. Hale Carpenter, vii–viii.28 [label F.C.F.]. Now *Heliaeschna libyana* (Fraser).

lieftincki (***Heliogomphus***), 1942a : 338, fig. 1 (6), 3 (13). Holotype ♀. Heliogomphus ♀, Maymyo, Upper Burma, Col. F. Wall. Type. lieftincki Fraser [labels F.C.F.].

lieftincki (***Macromia***), 1954 : 65–66, figs. 2, 4. LECTOTYPE ♂. Fernando Po, Moka, 28.i–3.ii.1933, W. H. T. Tams. M. lieftincki Fraser ♂ Type. F. C. Fraser det. 1953.

lieftincki (***Rhodothemis***), 1954b : 148–149, figs. 1m, n. LECTOTYPE ♂. N. Queensland, Annan River, Cooktown, 30.i.51, R. Dobson. I have not been able to trace a female from Annan River or Redlynch in Fraser's collection and I have therefore selected a female from Cooktown, N. Q., i.1908, R. J. Tillyard, BM (NH) coll. as allotype.

lilliputians (***Microgomphus***), 1923 : 60; 1923b : 329; 1926a : 855–856, pl. 1, fig. 7. Holotype ♀. Microgomphus lilliputians ♀, Tenasserim, Burma, 18.v.22, Type, F. C. Fraser [label F.C.F.]. The first description of this species was in a key to Indian Dragonflies (1923 : 60); an almost identical description occurs in the second reference, a key to Indian Gomphidae. Seeunder ***cyaneofrons*** (p. 187). In the third reference a full description is given and the type locality isfcited. In 1934 : 358, the date of the type is given as 18.iv.1923; this must be incorrect, as the first description was published only two days later!

lindgreni (***Onychogomphus***), 1923 : 65 (in key); 1923b : 332 (*Mesogomphus*); 1924c : 995–996. Holotype ♂. Mesogomphus lindgreni, Turzum, Darjeeling Dt, O. Lindgren [label F.C.F.]. The locality was incorrectly given and the correct locality has been written on the reverse of the label. Now *Paragomphus lindgreni* (Fraser).

lindgreni (***Protosticta***), 1920a : 150. Holotype ♂. India, Darjeeling, iii.1920, O. Lindgren [printed label]. Turzum Tea Estate, Darjeeling, ca Mar. 20. Protosticta sp. nov. P. lindgreni Fras. ♂, Type specimen [labels F.C.F.]. Syn. of *Protosticta himalaica* Laidlaw.

longfieldae (***Enallagma***), 1947a : 146–148, figs. 1b, f, 2a. Holotype ♂. E. Africa, Uganda, W. shores of L. Victoria, vii–ix.1927, G. D. Hale Carpenter [label D.E.K., from pencilled data by F.C.F.]. Enallagma longfieldae ♂ Fraser Type [label F.C.F.]. Allotype ♀. Same data. The left superior anal appendage of holotype had been glued to inside of paper triangle by Fraser, but it was missing when triangle was opened for setting (iii.1965).

longicauda (***Bayadera***), 1928 : 53. There is some doubt whether the example from Fraser's collection is indeed the type. The original description gives no indication as to the depository of the type but in 1934 : 84, Fraser states that it is in the Darjeeling Museum. In 1958 Fraser wrote to me (see under ***binocellata***, p. 183) that the types of Odonata in that museum were almost entirely destroyed.

The specimen of *longicauda* from Fraser's collection has been labelled Type by him, but it may only be a paratype.

longistigma (***Indogomphus***), 1922c : 422–424, pl. 11, fig. 8. LECTOTYPE ♂. Merogomphus longistigma, Gudalur, Nilgiris, 3,500′, 14.viii.1921, F. C. Fraser. The female of the pair mentioned by Fraser has not been traced in his collection, although it is possible that a female from the same locality but dated 5.viii.21 may be the allotype. There are no specimens with their original determination labels (*Indogomphus*) and the error in altitude of the lectotype and in the date of the female may be due to re-labelling. Now *Merogomphus longistigma* (Fraser).

longistyla (***Esme***), 1931 : 471, Fig. 6, vi. LECTOTYPE ♂. S. India, S. Kanara, Peraje, 8.x.1924, F. C. Fraser. Esme longistyla ♂, Type, Sampaji, Coorg, (Peraje enclave), 8.x.24, det. & coll. F. C. Fraser [label F.C.F.]. Allotype ♀. S. India, S. Kanara, Peraje, 14.ix.1924, F. C. Fraser. Esme longistyla ♀ cotype, Peraje, S. Canara, 14.ix.24. coll. F. C. Fraser [label F.C.F.].

[***loogali*** (***Microgomphus***), 1923 : 60; 1923b : 329.] *M. loogali* was originally described in a key to Indian Dragonflies, without indication that it was a new species or of its locality. (See under ***cyaneofrons***, p. 187). Fraser claims to have the type of *loogali*, as well as that of *burmicus* in his collection but I have not found any examples labelled *loogali* and the specimens of *burmicus*, which he places as a synonym of *loogali*, all have dates later than the publication of *loogali*. The type would appear to have been lost.

loringae (***Philoganga***), 1927 : 79–81. LECTOTYPE ♂. Burma, Maymyo, 1.viii. 1925, F. Wall. Philoganga loringae ♂, det. F. C. Fraser. Type [label F.C.F.]. Allotype ♀. Same data. The date on all three of the type-specimens was given as 19.vi.1924, and has been altered to agree with the published data.

lyttoni (***Gynacantha***), 1926f : 31–32. Holotype ♂. Darjeeling Distr., Singla, April, C. M. Inglis [label D.E.K.]. Gynacantha lyttoni ♂ sp. nov. (Type) [label F.C.F.]. Syn. of *Acanthagyna bayadera* (Selys).

mackwoodi (***Caconeura***), 1919 : 876–877. Holotype ♂. Caconeura mackwoodi sp. nov., Djatalawa, 5,000 ft., Ceylon. Type. F. C. Fraser [label F.C.F.]. Syn. of *Elattoneura centralis* (Selys).

magnus (***Paragomphus***), 1952 : 6–8, figs. 3a–f. Holotype ♀. Shimba Hills, Kenya Col., Dec. 1950, E. Pinhey. Paragomphus n. sp., det. F. C. Fraser, nearest cognatus (Ramb.). Largest species known [label F.C.F.]. Holotype, Paragomphus magnus Fraser ♀ [label E. Pinhey].

makoka (***Argia***), 1946 : 455–456, fig. 1a. Holotype ♂. S. America: S. E. Colombia, Umbria, 26.xi.1930. Argia makoka n. sp. ♂ [with name kokamella], Umbria, 26.xi.30. Argia mokaka ♂ n. sp. Type [labels F.C.F.]. The locality given in the description is Peru, Mishuyacu, xi.30. The spelling " mokaka " is obviously a slip. There is also a ♀ (not mentioned in the description) from Umbria, 31.xii.30, which is marked Argia makoka n. sp. Allotype in Fraser's writing. The apex of the abdomen is missing.

malabarensis (***Epophthalmia***), 1935 : 328–329. See ***binocellata*** (***Macromia***).

malabarensis (***Lamellogomphus***), 1924c : 990–991. Holotype ♀. Lamellogomphus malabarensis ♀, Palghat, Malabar, Coll. T. N. Hearsey, 16.vi.21 [label F.C.F.]. Now *Onychogomphus malabarensis* (Fraser).

malabarica (***Lestes***), 1929 : 847–848, pl. 2, fig. 6. Holotype ♂. Type, L. malabarica ♂, Chevayur, Malabar, 26.vi.28, Fraser [label F.C.F.]. Allotype ♀. Same data.

malabaricum (***Pseudagrion***), 1924 : 494–495. LECTOTYPE ♂. Pseudag. malabaricum ♂. Kodaikanal, Palni Hills, 4.ix.22, T. B. Fletcher coll., det. F. C. F., Type.

malabarica (ssp. of ***Zygonyx iris***), 1926 : 764–766. Lectotype ♂ (Fraser, 1936 : 396). India, Nilgiris, 3–4,500 ft., vi.1918, F. C. Fraser. Z. iris ♂, June '18, Nilgiris, 3,000–4,500 ft., [label F.C.F.]. Zygonyx iris malabarica Fras. ♂ Type, det. D. E. Kimmins, 1962. Allotype ♀. India, Nilgiris, iii.1916, 3,500 ft., F. C. Fraser. Zygonyx iris ♂, Nilgiris, 3,500 ft., Mar. 1919, Coll. F. C. Fraser [label F.C.F.]. Zygonyx iris malabarica Fraser ♀ Type, det. D. E. Kimmins, 1962.

malcolmi (***Brachydiplax***), 1922 : 231. LECTOTYPE ♂. Siam, Bangkok, ix. 1921, E. W. Trotter. Brachydiplax malcolmi ♂ Type, Coll. E. W. Trotter, Sept. 21, Bangkok [label F.C.F.]. Allotype ♀. Same data.

malloryi (***Davidius***), 1926d : 167–168, fig. 3iv, pl. 1, fig. 5. LECTOTYPE ♂. Assam, 5,500 ft., Khasi Hills, Laitlynghat, 21.iv.1924. Fletcher coll. Davidius davidi anchorites Fraser Type [labels F.C.F.]. Davidius malloryi Fras., det. D. E. Kimmins. Ex Pusa Collection. This appears to be another instance of a specific name being changed by Fraser before publication. I have no doubt that this specimen is *D. malloryi* Fraser. There was also a second specimen labelled Type in Fraser's collection, but since the Pusa specimen has been marked Type in B.M. (NH) for about forty years, I see no reason to make a change now.

martini (***Davidioides***), 1924 : 472–473, fig. 3. Holotype ♂. Davidioides martini ♂, Kunnoth, Malabar, 19.v.23. Type. S. India, F. C. Fraser [label F.C.F.].

martini (***Platygomphus***), 1922 : 68–69. Holotype ♂. Shillong, 6.vi.1920, Fletcher coll. Pusa Coll. Platygomphus martini ♂, Fraser det. 1921 [label T.B.F.]. Ex Pusa Collection. Now *Merogomphus martini* (Fraser).

mascarenica (***Nesocordulia***), 1948 : 5–7, fig. 1. Holotype ♂. N. mascarenica, Mandritsara, Madagascar (W. Janson), with on reverse, Type F. C. F. [label F.C.F.]. The allotype ♀ is said to be in the Paris Museum.

medusa (***Protosticta***), 1934a : 135–136, fig. 2. Holotype ♂. P. medusa Fraser, ♂ Type, Mergui, Lower Burma, coll. Dr A. Kerr, 31.v.1932, det. F. C. Fraser.

metallica (ssp. of ***Zygonyx iris***), 1931 : 450–451. Holotype ♂. Z. metallica Fras. ♂. Vayitri Ghat, 32 mile. S. Malabar, 14.iv.29, coll. F. C. F., Type [label F.C.F.]. Allotype ♀. Z. metallica ♀, Vayitri Ghat, S. Malabar, 32 mile, 7.iv.29, F. C. Fraser [label F.C.F.].

mildredae (***Ischnura***), 1927 : 87–88. Holotype ♂. Burma, Maymyo, 7.vi.1925, Col. F. Wall. [label D.E.K.]. Ischnura mildredae ♂, Fraser, Type [label F.C.F.].

mildredae (ssp. of ***Zygonyx iris***), 1926 : 766–767. LECTOTYPE ♂. Z. mildredae. Am Sakan, N. Shan States, Burma, 18.v.25, F. Wall. Allotype ♀. Same data. The allotype lacks its head.

millardi (***Gynacantha***), 1920a : 147. LECTOTYPE ♂. India, Poona, v.1918, F. C. Fraser. G. millardi Fraser ♂, Poona, May '18, type spec. [label F.C.F.]. Allotype ♀. Same data. The dates on the type specimens contradict the description, which gives x–xi and ii–iii. Now *Acanthagyna millardi* (Fraser).

[***miniata*** (***Macromia***), 1924 : 450–451, pl. 25, fig. 7]. LECTOTYPE ♂. Coorg, Somwarpet, 1.vii.23. flavocolorata. [data on envelope, F.C.F.]. Lectotype ♂, Macromia miniata Fraser, det. M. A. Lieftinck. In Leiden Museum. Neither of the two ♂ syntypes had been traced in Fraser's collection, but Dr M. A. Lieftinck recently informed me that he had the specimen listed above, which was presented to him by Fraser as an example of *Macromia flavocolorata* Fraser. Fraser had placed *M. miniata* as a synonym of *M. flavocolorata* and, as in similar cases, had re-labelled it and presumably did not realize that it was one of the types of *miniata* when he gave it away. Dr Lieftinck has marked it as the lectotype of *M. miniata* Fraser, and since the other syntype of *miniata* cannot be traced, I take this opprtunity of publishing his designation. Dr Lieftinck also informs me that he considers *M. miniata* to be distinct from *M. flavocolorata.*

minima (***Idionyx***), 1931 : 453–455, fig. 1a. LECTOTYPE ♂. Type. I. minima, 6.vi.31, Munnar Gt, Travancore, S. India, F. C. Fraser [label F.C.F.]. Allotype ♀. I. minima, Munnar Gt, Travancore, F. C. Fraser [label F.C.F.].

mishuyaca (***Argia***), 1946 : 453–454, figs. 1b, c. LECTOTYPE ♂. Type. Argia mishuyaca ♂, Katzenbach (Mishuyacu), 15 km. v. Iquitos, Peru, x.30. via Nagel [label F.C.F., on reverse of mounting card]. Allotype ♀. Argia mishuyaca ♀, Mishuyacu, 4.iv.30 [label F.C.F., on reverse of mounting card].

mollusca (***Argia***), 1946 : 454–455, figs. 1j, k, l. LECTOTYPE ♂. Type. Argia mollusca ♂, Mishuyacu, Peru, 4.iv.30 [label F.C.F., on reverse of card]. Allotype ♀. Same locality, 24.vii.30 [label F.C.F., as above].

montana (***Coeliccia***), 1933c : 116–117. Holotype ♂. C. montana Fras., Muang Huang, Laos, Evergreen jungle, A. Kerr, Type, 31.iii.32. det. F. C. Fraser [label F.C.F.].

montanus (***Phyllogomphus***), 1957 : 14, figs. 1a, 6b, 7c, 8b. Fraser did not specify a holotype, but marked a ♀ in his own collection as Type, probably because it was in better condition than the mis-identified ♀ type of *P. aethiops* Selys in BM (NH). I have accepted the Fraser specimen as type and hereby designate it as LECTOTYPE ♀. The data on the specimen are (1) Phyllogomphus coloratus Kimmins, Cameroons, ♀, det. F. C. Fraser; (2) Phyllogomphus montanus Fraser ♀ Type, det. F. C. Fraser [labels F.C.F.] and (3) Phyllogomphus montanus Fraser ♀

LECTOTYPE, det. D. E. Kimmins, 1965. The mis-identified ♀ type of *P. aethiops* Selys has been marked as a paratype of *P. montanus* Fraser.

[***montana*** (ssp. of ***Vestalis gracilis***), 1934 : 128.] The types of this subspecies, which was a new name for *V. gracilis amoena* Fraser, have not yet been traced in the Fraser collection.

mortoni (***Protosticta***), 1924 : 500–501, pl. 26, fig. 4. There has been some confusion over the labelling of the specimens presented to the BM (NH) in 1923 as types of this species. The description gives the type locality as Coorg, Sampaji Ghat, 23.v.23. The specimens bear museum-written labels Mangalore Ghat, 3,000 ft., 13.v.1922. Fraser's collection contains examples from Sampaji Ghat with dates 13.v.22, 13.v.24 and 12.v.32. There have obviously been errors in transcribing dates, etc., both by Fraser and possibly by our setting room staff. Unfortunately the original locality labels from the paper envelopes were not preserved, so there is no way of checking what Fraser actually wrote on these envelopes. I have therefore decided to give the published locality and date to the types presented to BM (NH) by Fraser. There are subsequent examples from Sampaji Ghat dated 1.v.24, but I do not consider them as part of the type series.

Lectotype ♂ (Fraser, 1933b : 113). S. India, Coorg, Sampaji Ghat, 23.v.23, Maj. F. C. Fraser. Protosticta mortoni Fras. ms. (Type), P. mortoni ♂ [label F.C.F.]. Allotype ♀. Locality as above, P. mortoni ♀ Cotype [label F.C.F.].

moundi (***Phyllogomphus***), 1960 : 141–144, figs. a–i. LECTOTYPE ♂. Phyllogomphus moundi Fraser ♂ Type, Ibadan, Nigeria, 1960, leg. L. Mound [label F.C.F.]. Allotype ♀. Phyllogomphus moundi Fraser, ♀ allotype, Ibadan, Nigeria, 1960, leg. L. Mound [label F.C.F.].

mudiensis (***Esme***), 1931 : 472–473. LECTOTYPE ♂. *Esme mudiensis* ♂, Munnar, Travancore, 24.v.29, coll. F. C. Fraser (Type) [label F.C.F.]. Allotype ♀. Same locality, 23.v.29. F. C. F. Coll. Allotype [label F.C.F.].

multinervosa (***Devadatta***), 1933c : 129–130. Holotype ♂ (teneral). Devadatta multinerve, Pu Tat, Laos, ca 1,200 m., Dr A. Kerr, Evergreen jnl., 22.iv.32. Devadatta multinervosa Fraser ♂ Type. D. E. Kimmins det. 1965. This type was located in a store box in Fraser's collection, without any indication that it was a type. It agrees in locality and neurational data and I have no doubt that it is the type. The left fore wing is now missing. The specific name is mis-spelt on the label.

nadganiensis (***Idionyx***), 1924 : 460. Lectotype ♀ (Fraser, 1936 : 238). India, Nilgiris, Nadgani Ghat, 3,000 ft., Maj. F. C. Fraser. Idionyx nadganiensis Fraser ♀ Type [label F.C.F.].

naia (***Agriocnemis***), 1932 : 747; 1933b : 387–389, fig. 166. Lectotype ♂ (Fraser, 1933b : 389). Mergui, Burma, Bott coll. Agriocnemis naia Fraser [labels F.C.F.]. Allotype ♀. Labels as above. This species was originally described in a key to Indian Dragonflies, without locality or indication that it was a new species. See under ***cyanofrons*** (p. 187). The type bears a label by Lieftinck " This is the same species as ***nana*** Laidlaw ". Syn. of *Agriocnemis* ***nana*** Laidlaw.

nietneri (***Ceylonosticta***), 1931a : 334–335, pl. 2, figs. vi–viii. Lectotype ♂ (Fraser, 1933 : 218). Type. C. nietneri, Kandy, 2,000′, Col. F. Wall [label F.C.F.]. The allotype ♀ was destroyed but Fraser selected a replacement female which he suggested should be a neallotype. It is labelled C. nietneri, Belihul Oya, Ceylon, 11.v.32, F. C. Fraser. Now *Drepanosticta nietneri* (Fraser).

nigra (***Caconeura***), 1922 : 42–43. Holotype ♂. King Island, Mergui, Bott coll. Caconeura nigra Fraser Type ♂, Fraser det. 1921 [labels T.B.F.]. Now *Prodasineura nigra* (Fraser).

nigrescens (***Vestalis***), 1929b : 584–585. LECTOTYPE ♂. V. nigrescens ♂, Kandy, Ceylon, 1.ix.24, F. Wall coll. det. F. C. F. Type [label F.C.F.].

nigriceps (***Lestes***), 1924a : 85–86. Lectotype ♂ (Fraser, 1933b : 56). Pusa, 17.vii.22. Fletcher coll. Lestes nigriceps Fraser, Type ♂ [labels T.B.F.]. Ex Pusa Collection.

nigricolor (***Amphithemis***), 1922 : 700–701. LECTOTYPE ♂. Type. Bengal, Hasimara, Duars, H. V. O'Donel [label D.E.K.]. A. nigricolor ♂ [label F.C.F.]. Amphithemis nigricolor Fraser ♂, D. E. Kimmins det. 1962. Allotype ♀. Locality as above. A. nigricolor ♀ [label F.C.F.]. Amphithemis nigricolor Fraser ♀, D. E. Kimmins det. 1962. Syn. of *Amphithemis vacillans* Selys.

nigricolor (***Hagenius***), 1924a : 76–79, pl. 10, figs. 1–2, 5–7. Holotype ♂. Sieboldius nigricolor, S. Shan States, 23.ix.23, Capt. Drummond [label F.C.F.].

nigroflavum (***Ceriagrion***), 1933b : 323–324, figs. 138a–b. Holotype ♂. Lower Burma, Ceriagrion nigroflavum Fraser ♂ Type, D. E. Kimmins det., 1965. This specimen and a paratype from Siam were found in envelopes in the Fraser papered collection.

nigrolineatus (***Anax***), 1935b : 23–25. Holotype ♂. A. nigrolineatus, Nagri spur, Darjeeling, 31.v.22, Col. Hirst coll. [label F.C.F.]. Allotype ♀. A. nigrolineatus [label F.C.F.].

nilgiriensis (ssp. of ***Idionyx corona***), 1922 : 66–67. See ***burliyarensis*** (***Idionyx***), p. 184. The name of this subspecies was changed to *burliyarensis* by Fraser, 1924, when it became a secondary junior homonym, due to the transfer to *Idionyx* of *Phyllomacromia nilgiriensis* Fras., 1918. The latter species was later made the type-species of *Idiophya* Fraser, 1934, but although *I. nilgiriensis* Fraser was only a secondary homonym, under Art. 59 (c) of the Code the name is not eligible for restoration, since it was rejected before 1960. Syn. of *Idionyx corona burliyariensis* Fraser.

nilgiriensis (ssp. of ***Onychogomphus biforceps***), 1922c : 425–426, figs. a–c. LECTOTYPE ♂. India, Nilgiris, Gudalur, 16.x.1921, T. B. Fletcher [label D.E.K.]. Lamellogomphus nilgiriensis Fras. ♂ Type [label F.C.F.]. Allotype ♀. India. Nilgiris, 3 miles from Gudalur, 16.x.1921, Maj. F. C. Fraser. Gomphus ♀, Gudalur, Type; O. biforceps nilgiriensis ♀ [label F.C.F.]. The locality labels had been incorrectly transcribed in our setting room and have been corrected from the original description.

nilgiriensis (**Phyllomacromia**), 1918 : 383–384; 1922d : 9. Holotype ♀. Phyllomacromia? nilgiriensis ♀, Nilgiris, 1917. Type Fraser. Now *Idiophya nilgiriensis* (Fraser).

nocturnalis (**Periaeschna**), 1927 : 71–72. Holotype ♂. Assam 5,000 ft., 14 June 1924, Fletcher coll. Beaten from jungle in Fruit Garden. Periaeschna nocturnalis Fraser ♂. Type [last two labels T.B.F.]. Ex Pusa Collection.

obscura (**Indoneura**), 1933b : 257–258, fig. 107. Holotype ♂. I. ramburi var. obscura Fras. ♂ Type. 10.x.1926. Koropur Ghat, Jaipur, 2,000 ft., coll. C. A. Souter. Type of I. obscura Fras. [label F.C.F.]. Now *Caconeura obscura* (Fraser).

occidentalis (**Phyllogomphus**), 1957 : 18–22, figs. 2a, e, 3c, 6a, 7b. Holotype ♀. Bwake, French Ivory Ct [label F.C.F.]. Phyllogomphus occidentalis Fras. ♀ Type, det. Fraser [label D.E.K.].

octomaculata (ssp. of **Palpopleura sexmaculata**), 1935b : 26–27. LECTOTYPE ♂. Assam, Sylhet, 11.viii.1921 [label D.E.K.]. 11.8.21 [label F.C.F.]. Palpopleura sexmaculata octomaculata Fraser, Sylhet, Assam [typewritten]. Palpopleura sexmaculata octomaculata Fras. ♂. D. E. Kimmins det. 1962.

odoneli (**Caconeura**), 1924e : 51–52. LECTOTYPE ♂. Bengal, Hasimara T. E., Duars, 8.iv.1923, H. V. O'Donel [label D.E.K.]. Caconeura odoneli, Huldibara T. E., Duars [label F.C.F.]. Allotype ♀. Bengal, Duars, Hasimara T. E., 10.iv.1923 [label D.E.K.]. Caconeura odoneli, Silli Toorsa, Duars, 10.4.23 [label F.C.F.]. The discrepancies in locality are probably due to errors in labelling the papered specimens. The lectotype has the head detached and damaged. Now *Prodasineura odoneli* (Fraser).

odoneli (**Gomphus**), 1922c : 420–421, pl. 11, fig. 5. Holotype ♂. G. odoneli ♂, Hasimara, Duars, Bengal, 21.ix.20, Type [label F.C.F.]. Allotype ♀. Same data [label F.C.F.].

odoneli (**Gynacantha**), 1922b : 700. Holotype ♂. G. odoneli, Hasimara, Duars, Bengal, India, H. V. O'Donel [labels F.C.F.]. Now *Acanthagyna odoneli* (Fraser).

olympicus (**Chlorogomphus**), 1933f : 257–258; 1933a : 464–465. Holotype ♂. Chlorogomphus olympicus ♂, Kufri, Simla, 8,400 ft., Capt. Elwes, 9.vi.29 [label F.C.F.]. The second reference also gives *olympicus* as a new species but is two months later.

orientalis (**Phyllogomphus**), 1957 : 16–18. LECTOTYPE ♂. Phyllogomphus aethiops ♂, Bugalla Is., L. Victoria, 1.ix.28. G. Hale Carpenter [label F.C.F.]. Phyllogomphus orientalis Fraser ♂, det. F. C. Fraser [label D.E.K.]. Allotype ♀. Same data as ♂. Although labelled as *aethiops* by Fraser, these specimens were placed above a typewritten label *orientalis* in his collection.

originata (race of ***Polythore derivata***), 1946 : 18–19, fig. 2b. Holotype ♂. Katzenbach (Mishuyacu), 15 km. v. Iquitos, Peru, 13.vii.31. Polythore sp. ♂. via Nagel, 1930. P. derivata race originata ♂. Allotype ♀. Same data as ♂, except date, 22.iii.30.

ornata (***Idionyx***), 1921a : 688–689; 1922 : 6. Holotype ♀. Shillong, 2 June 1920, Fletcher coll. Shillong, 2.vi.20, in jungle & difficult to see on wing. Idionyx ornata ♀ Type, Fraser det. May 1921 [labels T.B.F.]. Idionyx optata Selys ♀ [label F.C.F.]. Ex Pusa Collection. Syn. of *Idionyx optata* Selys.

osiris (ssp. of ***Zygonyx iris***), 1936 : 400–401. LECTOTYPE ♂. Z. mildredae ♂, Ani Sakan, N. Shan Sts, Burma, 18.v.25, F. Wall [label F.C.F.]. Zygonyx iris osiris ♂ Fras. Lectotype, D. E. Kimmins det. 1965. The type was not marked by Fraser, and was not traced until 1965, during the preparation of this paper. It was recognized by the nodal indices of the wings, complete distal antenodal nervures and five-celled subtrigone.

[***ovulosa*** (ssp. of ***Chlorocypha dispar***), 1947 : 23.] This subspecies is said to be based upon an example in the McLachlan collection from Old Calabar. Fraser did not mark any example in this collection as *ovulosa* and neither of the two Old Calabar examples agree at all well with the characters given by Fraser for this subspecies. There are in fact several inconsistencies in this account of *C. dispar* by Fraser, and one can only assume that he made rather hurried notes during one of his visits to the BM (NH) and later got them mixed. He refers to the type of *dispar* (which we do not have) as being in the BM (NH), from Sierra Leone. He gives a reference to fig. 1f as being from a male from Old Calabar, but according to his legend it is *C. dispar cordosa* from Gaboon. In view of these discrepancies, I find myself unable to recognize a type for the subspecies *ovulosa*.

pacifica (***Hemicordulia***), 1925 : 435–436. LECTOTYPE ♂. Western Samoa, Apia, 30.xii.1922, J. S. Armstrong. pacifica ♂ [label F.C.F.].

palampurensis (ssp. of ***Anotogaster basalis***), 1929a : 88–89. Holotype ♂. A. basalis palampurensis, Palampur, 4,000 ft., 4.v.25. C. M. Inglis.

pallidum (***Ceriagrion***), 1933c : 118–119, fig. 3. LECTOTYPE ♂. Type. Laos, Muang Cha, 1,100 m., iv.32, A. Kerr [label D.E.K.]. C. pallidum Fras., ♂ Type, Laos [label F.C.F.]. There is also a female labelled Allotype by Fraser from the same locality, which is not mentioned in the original description.

pallida (***Macromia***), 1924 : 456–457, pl. 15, fig. 8. Lectotype ♂ (Fraser, 1936 : 175). M. pallida, Hasimara, Duars, Bengal, 22.vi.23, H. V. O'Donel.

pallidistigma (***Calilestes***), 1926c : 489. Holotype ♂. Tonkin, Ngaio-Tio, 4,800 ft., 26.iv.1924, H. Stevens. Podolestes pallidistigma sp. n. ♂ (Type) F. C. F. [label F.C.F.]. The type is teneral and lacks the left fore wing and segments 7–10 of the abdomen.

paludensis (***Aciagrion***), 1922b : 698–699. LECTOTYPE ♂. India, Nilgiris, Masnagudi, 27.xi.1921, F. C. Fraser. Aciagrion paludensis Fraser ♂ Type, det. F. C. Fraser [labels D.E.K.]. Aciagrion paludensis ♂ Type, Masnagudi, Nilgiris,

27.xi.1921, coll. F. C. Fraser [label F.C.F.]. Allotype ♀. Data as ♂. Three of the original type-series of five (those from Masnagudi) were traced in the Fraser collection, in envelopes labelled *Aciagrion occidentalis* Laidlaw, with which species it is now synonymized. A ♂ and ♀ were labelled Type and allotype and the ♂ has been chosen as the lectotype. Syn. of *Aciagrion occidentalis* Laidlaw.

papavarina (***Hetaerina***), 1946 : 33–35, figs. 6a, b, 7a. LECTOTYPE ♂. H. papavarina ♂. Mishuyacu, Peru, 15.viii.30 [label F.C.F.]. Allotype ♀. H. papava [sic], same locality as ♂, 20.viii.30 [label F.C.F.].

patricia (***Lestes***), 1924 : 486, pl. 26, fig. 7. Holotype ♂. L. patricia Fras., Virajpet, Coorg, 24.vi.23, coll. F. C. F. [label F.C.F.]. This does not appear to be the original label.

periyashola (***Idionyx***), 1939a : 93–94. Holotype ♀. I. periyashola, Manar, Travancore, W. Ghats, 17.v.1933, S. India, F. C. Fraser [label F.C.F.].

peruviensis (***Protoneura***), 1946 : 459–460, figs. 5a, b. Holotype ♂. P. peruviense Fras., Mishuyacu, 2.vii.30 [label F.C.F. on mounting card].

pinheyi (***Lestes***), 1955 : 10, figs. 5–6. LECTOTYPE ♂. Rusape, 22.2.48, E. Pinhey. Lestes sp. n. E. C. G. Pinhey det. Mar. 1948. L. pinheyi Fraser [label F.C.F.]. Allotype ♀. Same data. L. pinheyi Fraser [label F.C.F.].

pinheyi (***Nepogomphoides***), 1952 : 3–6, figs. 1a, b, 2a–d. LECTOTYPE ♂. Kimboza Forest, Uluguru Mts, Tanga Territory, Oct. 1951, E. Pinhey. Nepogomphoides pinheyi ♂ Type, F. C. Fraser det. 1952. Syn. of *Nepogomphoides stuhlmanni* (Karsch).

platyceps (***Gomphidia***), 1953a : 189–190, figs. n, o. Holotype ♂. Gomphidia platyceps Fraser ♂ Holotype, Bhagmandala, Coorg, 17.vi.24. F. C. Fraser coll. [label F.C.F.].

platystigma (***Ceriagrion***), 1941 : 63–64, figs. A (1, 4), B (5). LECTOTYPE ♂. Uganda, N. W. shore of L. Victoria, vii.1927, G. D. Hale Carpenter [label D.E.K.]. Type, Ceriagr. platystictoides [sic] ♂ [label F.C.F.]. Ceriagrion platystigma Fras. ♂ Type [label D.E.K.]. Allotype ♀. Locality label as above [label D.E.K.], N. Western shores of L. Victoria, July–Sept. '27 [label F.C.F.]. Ceriagrion platystigma Fras., ♀ allotype [label D.E.K.]. Fraser's determination label on the lectotype ♂ is " platystictoides " but the published name is " platystigma ".

polychromatica (***Drepanosticta***), 1931a : 338. Holotype ♂. Darjeeling distr., Gopaldhara, v.vi [label D.E.K.]. D. polychromatica [label F.C.F.]. This is the only example of the species found in Fraser's collection and although not marked by him as the type, I believe it to be the holotype.

poungyi (***Coeliccia***), 1924e : 5253. Holotype ♂. Gokteik, [N. Shan States], 1,500 ft., 11.vi.1924, F. Wall. C. poungyi sp. nov., Gokteik, 1,500 ft., F. Wall coll., det. F. C. F., Type [label F.C.F.]. The description gives the date of capture as 26.x.21, probably another error of transcription from the original label.

praeclarum (***Pseudagrion***), 1924 : 493–494, fig. 3, vi; 1931 : 466. Holotype ♂. P. praeclarum ♂, Makut, Coorg, 29.xi.23. Coll. F. C. Fraser. Type [labels

F.C.F.]. India, Coorg, Makut, 29.xi.1923, F. C. Fraser. Pseudagrion praeclarum Fras., ♂ Type, det. F. C. Fraser [labels D.E.K.]. Allotype ♀. Tamaracherry, S. Malabar, 23.vi.28, F. C. Fraser coll. A. mimetes praeclara ♀. In his second reference to this species Fraser refers to the type as being rather teneral, but neither his original description nor the type suggest this. Syn. of *Archibasis oscillans* (Selys).

prateri (***Pseudotramea***), 1920a : 149. Holotype ♂. Pseudotramea prateri ♂ Type, Turzum, Darjeeling, Bengal, Feb. 1920, F. C. Fraser [label F.C.F.].

preciosus (***Orogomphus***), 1924a : 75–76, pl. 9, fig. 8; 1929a : 154–156. Holotype ♀. Sikkim, Mungpu, 4,000 ft., 10.v.22. Orogomphus preciosus Fras., ♀ Type. Fraser det. 1924 [labels T.B.F.]. Ex Pusa Collection. Allotype ♂. Chlorogomphus preciosus ♂, Pashok, Darjeeling, C. M. Inglis, 25.v.25 [label F.C.F.]. Now *Chlorogomphus preciosus* (Fraser).

protostictoides (***Protoneura***), 1946 : 458–459. Holotype ♂. P. protostictoides Fras. Mishuyacu, Peru, 16.vi.30. [label F.C.F., on mounting card].

pruinans (***Heliogomphus***), 1922c : 416–417, pl. 11, fig. 2. LECTOTYPE ♂. H. promelas Selys, Burliyar, Nilgiris, 3,000 ft., 29.vii.21. F. C. Fraser coll. [label F.C.F.]. Heliogomphus pruinans ♂ Fraser. Lectotype, D. E. Kimmins det. 1963. Allotype ♀. Same data. Fraser subsequently synonymized his species with *H. promelas* (Selys), removed his original labels and replaced them with new ones, which make no mention of the fact that the specimens were the types of *H. pruinans*. In his re-labelling, the altitude has been changed from 1,500 to 3,000 ft. Syn. of *Heliogomphus promelas* (Selys).

pruinosa (***Metacnemis***), 1928a : 129–130, fig. 3. LECTOTYPE ♂. Uganda, Budama & Bunyoli, x.1927, G. D. Hale Carpenter. Metacnemis pruinosa sp. nov., F. C. Fraser, type [label F.C.F.]. Allotype ♀. Uganda, Budama Dist., x.1927, G. D. Hale Carpenter. Metacnemis pruinosa sp. nov. [label F.C.F.]. Syn. of *Metacnemis singularis* (Karsch).

pulcherrima (***Ceylonicolestes***), 1924 : 487–489, pl. 26, fig. 9. LECTOTYPE ♂. S. India, Coorg, Mercara, 1.v.1923, Maj. F. C. Fraser. Lestes pulcherrima ♂ Fras. ms., Sidapur Rd swamp, Mercara, Coorg, 1.v.23 [label F.C.F.]. Allotype ♀. S. India, Coorg, Hallery, Mercara, 25.v.1923, Maj. F. C. Fraser. (Cotype) pulcherrima [label F.C.F.]. Now *Lestes* (*Indolestes*) *pulcherrima* (Fraser).

pulcherrimus (***Onychogomphus***), 1927 : 78–79. LECTOTYPE ♂. Onychogomphus pulcherrimus ♂ Type, Maymyo, Upper Burma, 31.v.25. The specific name was originally published as " pulcherrima ". Now *Nihonogomphus pulcherrimus* (Fraser).

[***quadrilateralis*** (***Aeschna***), 1927 : 70–71.] The type of this species (now placed as a synonym of *Tetracanthagyna waterhousei* McLachlan) has not been traced in the Fraser Collection, although it was stated to be there (1936 : 119). It was an incomplete ♂, with the last five abdominal segments missing. Syn. of *Tetracanthagyna waterhousei* McLachlan.

ramburi (**Coenagriocnemis**), 1956a : 70–71, fig. 1. LECTOTYPE ♂. Type. Mauritius, Les Mares, 26.xii.1947, J. Vinson, with on reverse, Coenagriocnemis ramburi n. sp. ♂, Fraser. C. ramburi Fraser ♂ Type, det. F. C. Fraser. Now *Agriocnemis ramburi* (Fraser).

ramburi (**Indoneura**), 1922 : 2–3. LECTOTYPE ♂. Madras, Coonoor, 6,000′, ix.1924. Mjr F. C. Fraser. I. ramburi ♂ Fras., Coonoor, 6,000′, Type [label F.C.F.]. Allotype ♀. Madras, Ootacamund, Nilgiri Hills, 27.vii.1921. Mjr F. C. Fraser. ramburi Fras. Type. Now *Caconeura ramburi* (Fraser).

reducta (**Uracis**), 1946 : 468–469, fig. 6a. Holotype ♂. Peru, Mishuyacu, 31.v. 1931. Uracis reducta sp. nov. ♂ Type, det. F. C. Fraser. Uracis reducta holotypus, präp. Dr Buchholz. The last label refers to a preparation of the penis made by Dr Buchholz.

rhinoceroides (**Idionyx**), 1934b : 565, fig. 3F. Holotype ♀. S. Malabar, Mannarghat, Dhoni, v.1923, F. C. Fraser [label D.E.K.]. I. rhinoceroides ♀ Type [label F.C.F.].

risi (**Gomphus**), 1922 : 73–74. Holotype ♀. India, Darjeeling Distr., near Mangpu, 3,400′, 31.viii.1920, C. M. Inglis [label D.E.K.]. Gomphus risi Fraser ♀ Type [label T.B.F.]. Ex Pusa Collection. The holotype of this species was missing for a number of years in BM (NH), but was discovered in May 1963 in the type collection, over the same label as the type of *Lamelligomphus cacharicus* Fraser. It had apparently been misplaced when the types were removed from the main collection for safety in 1940. In the meantime, as the type could not be traced, Fraser had marked a Neotype in his own collection. This specimen now bears an additional explanatory label. Now *Onychogomphus risi* (Fraser).

risi (**Indoneura**), 1931 : 469–471, fig. 6i. LECTOTYPE ♂. Type. D. risi (Fraser), Tamaracherry, S. Malabar, 9.x.1928, F. C. Fraser [label F.C.F.]. Now *Caconeura risi* (Fraser).

risi (**Mesogomphus**), 1924c : 996–997. Holotype ♂. Mesogomphus risi Kalaw, S. Shan States, coll. C. Dingavan. Now *Paragomphus risi* (Fraser).

robertsi (**Notiothemis**), 1944 : 42–43, figs. 1 (4–5), 2a. LECTOTYPE ♂. Notiothemis robertsi Fraser. L. Victoria, Uganda, vi.27, G. Hale Carpenter [label F.C.F.].

robusta (**Protosticta**), 1933c : 111–112. Holotype ♀. Taweing, Laos, ca 800 m., A. Kerr, 6.iv.32. P. robusta Fras. ♀ Type, Laos, 6.iv.32, det. F. C. Fraser.

rusticatus (**Mesogomphus**), 1928a : 135–136. LECTOTYPE ♂. Uganda, Bugalla, Is. Sesse, L. Victoria, viii.1927, G. Hale Carpenter. Mesogomphus rusticatus ♂, sp. nov. Type [label F.C.F.]. Allotype ♀. Same locality and date. Syn. of *Paragomphus hageni* (Selys).

ruwensoriensis (**Tetrathemis**), 1941b : 141–142, figs. 5–6. Holotype ♂. Uganda, Ruwenzori Mts, 1927, G. Hale Carpenter [label D.E.K.]. Tetrathemis ruwenzoriensis Fraser ♂ Type, det. F. C. Fraser.

saffronata (***Idionyx***), 1924 : 458–460. Lectotype ♂ (Fraser 1936 : 221). S. India, Coorg, Mercara, 10.v.1923, Maj. F. C. Fraser. saffronata Fraser [label F.C.F.]. Idionyx saffronata Fraser ♂ [label D.E.K.]. Allotype ♀. S. India, Coorg, on Napoklu Rd, 29.iv.1923, Maj. F. C. Fraser. Flying high in jungle, 5.30 p.m. Idionyx saffronata ♀ Fraser [label D.E.K.].

samoensis (***Pseudagrion***), 1925 : 430–432, fig. 1. LECTOTYPE ♂. Samoa, Suimu, 27.x.1923, J. S. Armstrong [label D.E.K.]. P. samoensis ♂. Allotype ♀. Same data. Presented to BM (NH) as holotype and allotype by Fraser, 1953.

sanguinostigma (***Ischnura***), 1953 : 123–124, figs. 4, 5, 10, 11, 15, 18. Holotype ♂. I. sanguinostigma Fras. ♂ Type. 1.x.51, Moa Moa stream, Apia. Segs. 8–10 blue. J. S. Armstrong coll. F. C. Fraser det. 1952. Allotype ♀. I. sanguinostigma Fras. ♀ Allotype. Moa Moa stream, Apia, 26.v.51. J. S. Armstrong. F. C. Fraser det. 1952. The date of the allotype is given as 1931 in the original description.

sanguinostigma (***Protosticta***), 1922d : 6–7, pl. 1, figs. 5, 6. LECTOTYPE ♂. Madras, Burliyar, Nilgiri Hills, Mjr F. C. Fraser, with on reverse, 29.vii.21. P. sanguinostigma ♂ Fras. [label F.C.F.]. Allotype ♀. India, Nilgiris, Burliyar, 7.viii.1921, F. C. Fraser [label D.E.K.]. 7.viii.21, Burliyar, P. sanguinostigma ♀ Type [labels F.C.F.]. Protosticta sanguinostigma Fraser ♀ Allotype [label D.E.K.]. There has been some confusion over the location and labelling of the type. The original description states " Type in my own collection, paratypes in British and Indian Museums." The dates given are 3.vii and 23.vii.1921. I have not traced any specimens with these dates but 2 ♂ (of the original four) were presented to BM (NH) early in 1922 in a collection containing " types of new species "; one of the males (type) was labelled 7.viii.1921 and the other 29.vii.1921. In addition, a third male has been found in the Fraser papered collection, also dated 29.vii.1921. I have therefore assumed that there had been a printing error in the second date and that the ♂ with a BM Type label (now Lectotype) had also been given an inaccurate date and this has been changed to 29.vii.1921, in agreement with the other two males. The fourth male, possibly dated 3.vii.1921, presumably went to the Indian Museum.

schmidti (***Onychogomphus***), 1937 : 163–164, figs. 1a, 2a. LECTOTYPE ♂. Onychogomphus [bistrigatus (deleted)] ♂, Gopaldhara, Assam, H. Stevens, 21.ix.10. [Allo(deleted)]type ♂. schmidti Fraser [labels F.C.F.]. Onychogomphus schmidti Fraser, ♂ Lectotype, D. E. Kimmins det. 1965. Allotype ♀. Onychogomphus [bistrigatus (deleted)] ♀, Simla Sts, 19.vii.28. schmidti Fraser [labels F.C.F.]. Onychogomphus schmidti Fraser, ♀ Allotype, D. E. Kimmins det. 1965. The specimens listed above were the ones which Fraser considered the types of his new species *O. schmidti*. In BM (NH) there is also a ♂, marked by Fraser as an allotype of *O. bistrigatus* Selys, which is in fact a ♂ *O. schmidti*.

seductus (***Macrogomphus***), 1926h : 737–738, pl. fig. 2, text-figs. 1a, 2iii–v. Holotype ♂. Macrogomphus seductus ♂. Hasimara, Duars, Bengal. 8–15.vi.23. H. O'D. [label F.C.F.]. Allotype ♀. Same data [label F.C.F.].

selysi (***Chlorogomphus***), 1929a : 158–160, fig. 32. LECTOTYPE ♂. Chlorogomphus selysi ♂, Mangpu, Darjeeling, 6.v.27, F. C. F. [label F.C.F.]. Chlorogomphus selysi Fraser, ♂ Type, Moungpoo, Br. Sikkim, 3,600 ft., coll. F. C. Fraser, 27.v.27 F. C. F., [typewritten]. There is also an allotype ♀, Chlorogomphus selysi ♀, Mangpu, Darjeeling, 6.v.27, F. C. F., which is not mentioned in the original description. Fraser (1936 : 24) might appear to have indicated a lectotype (Type in British Museum) but this example remained in his own collection until 1958.

senchalensis (ssp. of ***Davidius aberrans***), 1926d : 170. Holotype ♀. Davidius aberrans senchalensis, Senchal, Darjeeling Distr., 8,000 ft., 19.v.24, C. Inglis [label F.C.F.].

shanensis (***Macromidia***), 1927 : 67–68. Lectotype ♂ (Fraser, 1936 : 210). Type. Macromidia shanensis, Maymyo, Upper Burma, 31.v.25, Col. F. Wall [label F.C.F.]. Allotype ♀. Macromidia shanensis, Maymyo, Upper Burma, 7.vi.25.

siamensis (***Burmagomphus***), 1926a : 411–412. Holotype ♀. Burmagomphus siamensis ♀. Don Chai, 5.xi.23, coll. S. Williamson. Type [label F.C.F.]. The original description gives as locality only Bangkok, Siam. Syn. of *Burmagomphus williamsoni* Fraser.

siamensis (ssp. of ***Onychothemis tonkinensis***), 1932 : 284–286. Holotype ♂. O. testacea siamensis. Siam. Dr A. Kerr. [label F.C.F.]. Onychothemis tonkinensis siamensis Fraser ♂ Type. D. E. Kimmins det. 1965. The unique type was found in a store box, without indication that it was a type. It was identifiable from the two rows of cells in the discoidal field and the uncrossed triangle, both in the right fore wing. Fraser originally described this as a subspecies of *O. tonkinensis*, but the present label is obviously a replacement, as he has now placed it as *O. testacea siamensis*. It may well prove to be a small example of *O. testacea* Laidlaw.

[***siamensis*** (***Pseudagrion***). 1922a : 235–236, fig. 2a.] The type of this species has not yet been traced in the Fraser collection.

sikkima (ssp. of ***Lestes praemorsa***), 1929 : 843–844. Holotype ♂. N. E. India, Sikkim, Kurseong, 4,300 ft., O. Lindgren [label D.E.K.]. Lestes, Sikkim, Lindgren [label F.C.F.]. Allotype ♀. Same data. Additional data obtained from envelope and original description. Now *Paralestes praemorsa sikkima* (Fraser).

sinuatus (***Burmagomphus***), 1933g : 33–35, fig. 6. Holotype ♀. Burmagomphus sinuatus ♀, Urugalla, 8.v.32. Type. F. C. Fraser Coll.

smithi (***Crocorthetrum***), 1921b : 162–163, pl. 3. Holotype ♂. Crocorthetrum smithi ♂ Type, Langbiang Prov., Siam-Annam Frontier, 12.19–1.20. F. C. Fraser [label F.C.F.].

souteri (***Disparoneura***), 1924 : 521–522. Holotype ♂. India, Coorg, Sampaji, 18.iv.1924, Maj. F. C. Fraser. D. souteri. [label F.C.F.]. Allotype ♀. India, Coorg, Sampaji Ghat, 18.iv.1924, Maj. F. C. Fraser, Disparoneura souteri ♀ [label F.C.F.]. Now *Elattoneura souteri* (Fraser).

souteri (ssp. of ***Microgomphus torquatus***), 1924 : 474. Holotype ♂. S. India, Coorg, Sampaji Ghat, 7.x.1923, Maj. F. C. Fraser. Microgomphus souteri Fras. ♂. Sampaji Ghat, Coorg, 7.x.23, F. C. F. [label F.C.F.]. Allotype ♀. M. souteri Fras., Allotype ♀. Hallery, Coorg, 7.vi.23, Fraser [label F.C.F.]. Now *Microgomphus souteri* Fraser.

spatula (***Lestes***), 1946b : 46–48, figs. 1a, b. LECTOTYPE ♂. L. spatula Fras. Concordia, R. A., xii.35, coll. Hayward [label F.C.F.]. Allotype ♀. Same data.

[***spencei*** (***Pseudagrion***), 1922 : 47–48.] The holotype ♀ from Shillong (which was in the Pusa collection) has not been traced, and the species was not included in the list of Pusa types presented to the BM (NH). There is in the Fraser collection a male marked Type, which is labelled Shillong, 10.v.22. This is not mentioned in the original description. The label has the appearance of being a fairly recent one and it is possible that it is the allotype ♂, with an incorrect locality label.

[***stevensi*** (***Davidius***), 1923 : 61; 1923b : 330.] Type not traced. This is another case in which Fraser has used a new specific name in a key, without any indication that it is a new species, and apart from the above second reference, has not used it again. See under ***cyaneofrons***, (p. 187). It is an available name, and I include it in this paper to draw attention to it, in the hope that a specialist on Indian Gomphines may perhaps be able to recognize it and possibly place it in the synonymy of an earlier species.

stevensi (***Idionyx***), 1924 : 462–463, pl. 26, fig. 1. LECTOTYPE ♂. Type. I. stevensi. Gopaldhara, Bengal, 8.vi.21. [label F.C.F.]. Allotype ♀. Assam, Darjeeling Distr., Rungbung Valley, Gopaldhara, H. Stevens [label D.E.K.]. Idionyx stevensi Fras. [label F.C.F.].

stevensi (***Protosticta***), 1922 : 7–8, pl. 1, figs. 1, 2, 7. LECTOTYPE ♂. S. India, Nilgiris, Coonoor Rd, 2,500 ft., Burliyar R., 29.vii.1921, F. C. Fraser [label D.E.K.]. P. stevensi ♂, Burliyar, 2,500 ft., 19.7.21 [label F.C.F.]. Allotype ♀. Same data, P. stevensi ♀ Fras. [label F.C.F.]. The date in the original description is given as 24 instead of 29.vii. The lectotype is the ♂ presented to the BM (NH) as type. Syn. of *Protosticta gravelyi* Laidlaw.

stevensoni (***Gynacantha***), 1927a : 36–37. Holotype ♂. G. stevensoni, Nukualofa, Tonga, 17.ii.1925, G. Hopkins. Now *Acanthagyna stevensoni* (Fraser).

striatus (***Onychogomphus***), 1924c : 1001. Holotype ♂. Onychogomphus striatus ♂, Kalar, Nilgiris, 1,520 ft., v.1917, F. C. F., Type [label F.C.F.]. The label gives the month of capture as June, not May.

subaequistyla (***Copera***), 1928a : 127–128. LECTOTYPE ♂. Uganda, Entebbe, Shore of L. Victoria, vii–viii.1927, G. Hale Carpenter. Copera subaequistyla sp. nov. ♂. Type [label F.C.F.]. Allotype ♀. Same data. Now *Platycnemis subaequistyla* (Fraser).

submontana (***Ceylonosticta***), 1933 : 214–216, fig. 8. LECTOTYPE ♂. Type. C. submontana, Ceylon, Kandy, 1.ix.24, Col. F. Wall. [label F.C.F.]. Allotype ♀. Same data. The ♂ is labelled November instead of September. Now *Drepanosticta submontana* (Fraser).

submontana (ssp. of ***Vestalis apicalis***), 1934 : 130. Holotype ♂. India, Nilgiris, Gudalur, 3,000 ft., 20.ix.1922, F. C. Fraser. Vestalis apicalis submontana Fraser ♂ [labels D.E.K., transcribed from rubber stamped labels]. V. submontana (type) [label F.C.F.]. Allotype ♀. Same locality, date 9.ix.1922. V. submontana allotype ♀ [label F.C.F.].

subplatystyla (***Anisopleura***), 1927 : 81–82. LECTOTYPE ♂. Assam, Shillong, 4.vi.24, T. B. Fletcher. Anisopleura subplatystyla ♂ sp. nov., 4.vi.24, Shillong, Assam, coll. T. B. Fletcher, Type [label F.C.F.]. The type was stated to be in the Pusa Collection, but it appears to have remained in Fraser's collection until it was presented by him to the BM (NH) in 1937.

subtropica (***Ceylonosticta***), 1933 : 209–211, fig. 5. LECTOTYPE ♂. Type. C. subtropica. Pettigalla, Ceylon, 21.vi.26, G. M. Henry. Allotype ♀. C. subtropica, Belanagoda, Ceylon, 21.vi.26, G. M. Henry [both labels F.C.F.]. Slips in re-labelling have occurred in both types, the date being given as " iv " instead of " vi ", and the collector's initials are G. M., not C. M. or C. Fraser gives no indication as to the number of specimens ; so far only the lectotype and allotype have been found.

superbus (***Megalogomphus***), 1931 : 460–463, figs. 3, 4iii. LECTOTYPE ♂. S. India, Coimbatore Distr., v.1931, F. C. Fraser. Megalogomphus superbus Fraser ♂, Bolovumpatti Forest, Coimbatore District, F. C. Fraser, May '31 [label F.C.F.]. Allotype ♀. Same data.

superplatypes (***Copera***), 1927 : 88–89, figs. 6b, 7b. Holotype ♂. Bengal, Duars, Hasimara T. E., 6.viii.1923, H. V. O'Donel [label D.E.K.]. Copera superplatypes Type [label F.C.F.]. This species was based upon a single male. The Fraser collection also contained a specimen labelled by him as allotype ♀ from the same locality. I have not traced any reference to the description of this specimen. The locality labels were large, typewritten ones and were not retained after transcription. Now *Platycnemis superplatypes* (Fraser).

sylvatica (***Macromia***), 1954 : 56–58, figs. 4–5. Holotype ♂. Malaba Forest, Kabras, Kenya Colony, June 1932, T. E. Jackson. Macromia sylvatica Fras. Holotype ♂ [label F.C.F.]. Allotype ♀. Same data.

tamaracherriensis (ssp. of ***Merogomphus longistigma***), 1931 : 460. Holotype ♂. Merogomphus tamaracherriensis ♂, Tamaracherri, S. Malabar, 19.ix.28, Type [label F.C.F.]. Allotype ♀. Same locality, date 9.ix.28 [label F.C.F.]. Now *Merogomphus tamaracherriensis* Fraser.

t-coerulea (***Indoneura***), 1933b : 256. Holotype ♂. Type. I. ramburi var T-coeruleum Fr., Nilgiris, 24.vii.1921. Coll. F. C. Fraser [label F.C.F.]. Fraser infers that he has seen several examples but I have traced only this one specimen in his collection. Now *Caconeura t-coerulea* (Fraser).

tenaculatus (***Libyogomphus***), 1926b : 358–359. Holotype ♂. Africa, Cameroons ix.1918. Libyogomphus tenaculatus Fras. Now *Tragogomphus tenaculatus* (Fraser).

terminata (race of ***Polythore derivata***), 1946 : 20–21, fig. 1d. Holotype ♂. San Antonio, Peru, xii.1932. P. derivata race terminata. Allotype ♀. Same locality, i.1933 [labels F.C.F.]. The date of the allotype differs from that given in the original description (xi–xii.1932).

theebawi (***Caconeura***), 1922 : 40–41. Holotype ♂. Mergui, 1921, Bott coll. Caconeura theebawi Fras., Fraser det. 1921. Type ♀ [3 labels T.B.F.]. Allotype ♀. King Island, Mergui, Bott coll. Caconeura theebawi Fraser. Cotype ♀, Fraser det. 1921 [2 labels T.B.F.]. Ex Pusa Collection.

tillyardi (ssp. of ***Diphlebia lestoides***), 1956 : 305, figs. 1, 3, 5. LECTOTYPE ♂. D. lestoides tillyardi Fraser ♂. Cameron Creek, 28.xii.1954, Mt Tambourine, S. Queensland, R. Dobson coll. det. F. C. Fraser [label F.C.F.]. Allotype ♀. Same locality, date 4.i.1955.

tillyardi (***Palaeothemis***), 1923 : 33–34, figs. 2, 3. Holotype ♂. Mergui, 1921, Bott coll. Palaeothemis tillyardi Fraser, ♂ type, Fraser det. 1922 [labels T.B.F.]. Ex Pusa Collection.

tonkinicus (***Onychogomphus***), 1926c : 481. Holotype ♂. Tonkin. Onychogomphus tonkinicus Fraser ♂ Type.

travancorensis (***Idionyx***), 1931 : 455–456, fig. 1c. Lectotype ♂ (Fraser, 1934 : 225). Type. I. travancorensis ♂, Munnar Ghat, Travancore, 30.v.31. F. C. Fraser. [label F.C.F.]. Allotype ♀. Western Ghat, Travancore, 7.vi.31, F. C. Fraser [label F.C.F.].

trifoliata (***Argia***), 1946 : 449–450, figs. 1h, i. LECTOTYPE ♂, allotype ♀. S. America, S. E. Colombia, Umbria, 30.xi.30. Argia trifoliata n. sp. ♂ & ♀. Type and allotype, det. F. C. Fraser [label F.C.F.]. The combined determination label in Fraser's writing is on the holotype.

trilobata (***Protosticta***), 1933 : 112–114, fig. 1. Holotype ♂. P. trilobata Fraser ♂ Type. Laos, coll. Dr Kerr, 28.iv.1932 [label F.C.F.]. Muang Cha, Laos, ca 1,100 m., coll. A. Kerr, 28.iv.1932 [typed label]. In Fraser's label, the date was given as 25.vi.

trinervulata (***Heliaeschna***), 1955 : 16–17. Holotype ♂. Entebbe, Uganda, '28. Hale Carpenter. H. trinervulata Fraser, ♂ Type, det. F. C. Fraser [labels F.C.F.].

trituberculata (***Macromia***), 1921a : 685–686. LECTOTYPE ♂. Shillong, 20 Sept. 1920, over stream, Fletcher coll. Macromia trituberculata ♂ Fras., Type [label T.B.F.]. Ex Pusa Collection. Syn. of *Macromia moorei* Selys.

[***trotteri*** (***Pseudocopera***), 1922a : 237–238.] The types of this species have not yet been traced in the Fraser collection. Probably syn. of *Platycnemis annulata* (Selys).

umbriaca (***Argia***), 1946 : 451, fig. 2i, j. LECTOTYPE ♂, allotype ♀. S. America, S. E. Colombia, Umbria, 28.xi.1930. Argia umbriaca n. sp. Type & allotype ♀, Umbria, 28.xi.30, det. F. C. Fraser [label F.C.F.]. The allotype now lacks segments 7–10 of the abdomen.

uncata (***Protosticta***), 1931a : 75–76. LECTOTYPE ♂. Upper Burma, N. Shan States, Gok Teik, 1.vi.24, F. Wall [label D.E.K.]. P. uncatus, Gok Teik, 1.vi.24 [label F.C.F.]. Protosticta uncata Fras. ♂ [label D.E.K.]. Allotype ♀. Same data. The specific name (published as *uncatus*) was later corrected by Fraser to *uncata*. The specimens appear to be rather teneral.

unguiculata (***Idionyx***), 1926 : 204–205, pl. 8, fig. 3. Lectotype ♂ (Fraser, 1936 : 232). Type. I. unguiculata ♂, Maymyo, Upper Burma, 16.vi.25, Col. F. Wall, [label F.C.F.]. Allotype ♀. Burma, Maymyo, 31.v.1925, Col. F. Wall. Idionyx unguiculata sp. nov. Allotype [label F.C.F.]. The original locality label on the allotype erroneously gave F. C. Fraser as the collector.

unifasciata (***Periaeschna***), 1935b : 25–26. Holotype ♂. P. unifasciata, Moongpu, Darjeeling Distr., 28.v.27, F. C. Fraser [label F.C.F.]. Allotype ♀. Same data.

vallisi (***Phasmosticta***), 1955a : 227–229, fig. 1. LECTOTYPE ♂. Type. Phasmosticta vallisi Fraser ♂. Rockhampton, N. Q., C. Vallis, iv.1954 [label F.C.F.]. Allotype ♀. Same data. The labels on these two specimens give the date of, capture as iii.1955.

varralli (***Mortonagrion***), 1920 : 148. LECTOTYPE ♂. India, Bombay, Vihar Lake, Mar. 1919. Mortonagrion varralli Fras. Type [label F.C.F.].

veronica (***Indolestes***) 1924a : 85. Lectotype ♀ (Fraser, 1933b : 77). Kumaon, 7,500 ft., Muktesar, 1 Oct. 1922, Fletcher coll. Indolestes veronica Fraser ♀ Type, Fraser det. 1922 [label T.B.F.]. Indolestes veronica ♀ sp. nov. Type [label F.C.F.]. Ex Pusa Collection. A nymphal exuvium is associated with the type. Syn. of *Lestes* (*Indolestes*) *cyaneus* Selys.

versicolor (***Telebasis***), 1946 : 42–43, fig. 12. Holotype ♂. Telebasis versicolor Fras., Umbria, S. E. Colombia. [label F.C.F., on mounting card].

v-flavum (***Burmagomphus***), 1926a : 414–415. LECTOTYPE ♀. Burmagomphus V-flavum ♀, Maymyo, Burma, F. Wall coll. 15.vi.24. Type [label F.C.F.].

victoria (***Agriocnemis***), 1928a : 123–125, fig. 1. LECTOTYPE ♂. Uganda, N. W. shores of Lake Victoria, vii–ix.1927, G. D. Hale Carpenter. Agriocnemis victoria sp. nov. [label F.C.F.].

vinsoni (***Ischnura***), 1949 : 140, figs. 1a, b, c. LECTOTYPE ♂. Mauritius, Moka, 12.i.1947, J. Vinson [label D.E.K.]. Ischnura vinsoni Fraser, Type [label F.C.F.]. Allotype ♀. Same locality, date 12.xii.1946. Fraser presented to the BM (NH) in 1949 a ♂, ♀ of this series as type and allotype, but this was an error on his part, as the specimens were collected later than the type series. The true types were discovered in his collection after his death.

violacea (***Coenagrion***), 1924a : 84–85. Holotype ♂. Ranchi, 1.ix.22, Fletcher coll. [label T.B.F.]. Coenagrion violacea sp. nov. (Type) [label F.C.F.]. Ex Pusa Collection. Wings rather damaged, right pair with only bases remaining.

viridata (***Rhinagrion***), 1938 : 198. Holotype ♂. Rhinagrion viridata ♂, Tenasserim–Bachrup boundary, 28.v.32, A. Kerr coll. [label F.C.F.].

viridis (***Drepanosticta***), 1922 : 39–40. Holotype ♂. Mergui, Bott coll. Drepanosticta viridis ♂ Type [labels T.B.F.]. Ex Pusa Collection.

vitrinella (***Rhinocypha***), 1935 : 332–333. Holotype ♂. R. vitrinella ♂, Cachar, Assam, Antram coll. [label F.C.F.].

walli (***Ceylonosticta***), 1931a : 335–336. The holotype could not be traced in Fraser's collection. He therefore selected the following ♀ specimen, which he suggested should be considered as NEOTYPE. It bears the following labels: C. walli ♀, Kadugannawa Ghat, Kandy, Ceylon, 14.v.32. F. C. Fraser coll. [label F.C.F.]. Type ♀ untraced. This specimen selected as neotype in consultation with F. C. Fraser, 1958 [label D.E.K.]. Allotype ♂. Same locality and date.

walli (***Dysphaea***), 1927 : 82–83. LECTOTYPE ♂. D. walli, Gok Teik, Burma, 30.v.24. Col. F. Wall [label F.C.F.]. In the original description the locality is given as Maymyo; Gok Teik is probably an error in relabelling. The type was stated to be in the British Museum, but remained in Fraser's collection until his death. The other three males listed have not been traced.

walli (***Heliogomphus***), 1925a : 849–851. Holotype ♀. Heliogomphus walli ♀, Nalande, Ceylon, 10.ix.24, F. Wall coll. [label F.C.F.]. The allotype ♂ is in the Colombo Museum.

walli (***Onychogomphus***), 1924b : 109. Lectotype ♂ (Fraser, 1934 : 288). Nepogomphus walli ♂. Maymyo, Upper Burma, vi.24. Type ♂ [label F.C.F.] Allotype ♀. Same data. Now *Nepogomphus walli* (Fraser).

wheeleri (race of ***Drepanosticta fontinalis***), 1942 : 96. Holotype ♂. Malaya, Wellesley, Bukit Mertajam, 25.v.1936. D. fontinalis Lieft., race wheeleri [label F.C.F.]. Syn. of *Drepanosticta fontinalis* Lieftinck.

wheeleri (***Gomphidictinus***), 1942 : 100–101, figs. 2–3. Holotype ♂. Malaya, Cameron Highlands Rd, nr Ramaswami Waterfall, 14th mile, 11.viii.1932, R. L. Wheeler. Gomphidictinus wheeleri ♂ Type [label F.C.F.]. Syn. of *Gomphidia perakensis* Laidlaw.

wilkinsi (***Cyclogomphus***), 1926d : 161–162. Holotype ♂. Cyclogomphus wilkinsi ♂. Hunse R., Coorg, Mysore, 12.x.24, coll. F. C. Fraser [label F.C.F.]. Allotype ♀. India, Hunse R., Mysore, 12.x.24, F. C. Fraser. Cyclogomphus wilkinsi ♀ Fras. [label D.E.K.].

williamsoni (***Gomphidia***), 1923a : 670–671. Holotype ♂. India, Bengal, Hasimara, Duars, v–vi.1923, H. V. O'Donel [label D.E.K.]. Gomphidia williamsoni ♂ Type [label F.C.F.]. Allotype ♀. Gomphidia williamsoni ♀, Hasimara T. E., Duars, Bengal, H. V. O'Donel [label F.C.F.]. The BM (NH) locality label on the type was inadequate and incorrect, giving no date and Fraser as collector. It has therefore been replaced. In Fraser's collection another ♂ was discovered incorrectly labelled as type, the type having already been presented to the BM (NH) in 1923.

williamsoni (***Pseudagrion***), 1922 : 46–47. Holotype ♂. Mergui, 1921, Bott coll. Pseudagrion williamsoni ♂, Fraser det. 1921. Type [labels T.B.F.]. Ex Pusa Collection.

[***wynaadensis*** (race of ***Pseudophaea fraseri***), 1922d : 8–9.] I have been unable to trace any specimens referred by Fraser to this race in his collection, and as he makes no subsequent reference to it, one can only presume that he considered it as a synonym of *fraseri*. Now *Indophaea fraseri* (Laidlaw).

wynaadicus (***Macrogomphus***), 1924 : 471–472. Holotype ♀. M. wynaadicus ♀, Masnagudi, Nilgiri Hills, 18.viii.22, F. C. Fraser [label F.C.F.].

xanthoptera (***Orogomphus***), 1919 : 874–875. Holotype ♀. Cumbum, Madura Distr., May–June 1917, S. H. Prater. Orogomphus xanthoptera, F. C. Fraser, Type. Type ex Bombay Museum. The original description gives the specific name as *xantheptera*. Now *Chlorogomphus xanthoptera* (Fraser).

zeylanica (***Macromia***), 1927 : 69–70. Holotype ♂. M. zeylanica. Kandy, Ceylon, 13.ix.24, Col. F. Wall.

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1923b. Indian Dragonflies. Pt XVI. *J. Bombay nat. Hist. Soc.* **29** : 324–333, figs. 1–3.

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1939a. Additions to the family Corduliidae, including descriptions of two new species and a new genus. *Proc. R. ent. Soc. Lond.* (B) **8** : 91–94, fig. 1.

1939b. *Libellago adami*, a new species of dragonfly from Ceylon (Odonata). *Proc. R. ent. Soc. Lond.* (B) **8** : 23–24, 1 fig.

1940. A new species of *Chlorocypha* (Order Odonata). *Ann. ent. Soc. Am.* **33** : 552–554, 4 figs.

1940a. A new species of *Chlorogomphus* (Order Odonata). *Proc. R. ent. Soc. Lond.* (B) **9** : 55–56, 1 fig.

1941. New African species of *Ceriagrion* (Order Odonata). *Proc. R. ent. Soc. Lond.* (B) **10** : 61–66, 2 figs.

1941a. Results of the Mission P. Lepesme, R. Paulian and A. Villiers in the Cameroons. Order Odonata. *Proc. R. ent. Soc. Lond.* (B) **10** : 35–42, 2 figs.

1941b. Notes on the genus *Tetrathemis* Brauer, with descriptions of three new African species (Odonata). *Proc. R. ent. Soc. Lond.* (B) **10** : 137–142, 9 figs.

1942. Dr. Raymond Wheeler's collection of Odonata from the Federated Malay States, with descriptions of a new genus and two new species. *Proc. R. ent. Soc. Lond.* (B) **11** : 95–104, 4 figs.

1942a. Notes on the genus *Heliogomphus* Laidlaw, with descriptions of two new species. *Trans. R. ent. Soc. Lond.* **92** : 333–334, 3 figs.

1943. *Lestes albofasciata* : a new species of Odonata from Buru Island. *Proc. R. ent. Soc. Lond.* (B) **12** : 113–115, 2 figs.

1943a. Notes on the genus *Agriogomphus* Selys and *Ischnogomphus* Williamson, with description of the male of *Agriogomphus sylvicola* Selys (Odonata). *Proc. R. ent. Soc. Lond.* (B) **12** : 161–166, 2 figs.

1944. A note on the genus *Notiothemis* Ris, with the description of a new species. (Order Odonata). *Proc. R. ent. Soc. Lond.* (B) **13** : 40–43, 2 figs.

1944a. New Ethiopian and Oriental Dragonflies (Order Odonata). *Proc. R. ent. Soc. Lond.* (B) **13** : 85–88, fig. 1.

1946. Notes on Amazonian Odonata in the Leeds Museum. *Trans. R. ent. Soc. Lond.* **96** : 11–46, 1 pl., 13 figs. ; **97** : 443–472, 7 figs.

1946a. One rare and two new species of Odonata from Tropical Africa and Asia. *Proc. R. ent. Soc. Lond.* (B) **15** : 41–45, 2 figs.

1946b. *Lestes spatula*, a new species of Dragonfly from the Argentine Republic. *Proc. R. ent. Soc. Lond.* (B) **15** : 46–48, 1 fig.

1946c. *Hylaeothemis indica*, a new species of Oriental Libelluline (Odonata). *Proc. R. ent. Soc. Lond.* (B) **15** : 97–100, 3 figs.

1947. The Odonata of the Ivory Coast, based upon the Mission of Dr. R. Paulian and P. Lepesme. *Trans. R. ent. Soc. Lond.* **98** : 19–39, 8 figs.

1947a. The synonymy of *Enallagma elongatum* (Martin) and *E. pseudelongatum* Longfield, and their differentiation from a new African species. *Proc. R. ent. Soc. Lond.* (B) **16** : 143–148, figs. 1–2.

1948. Three new species of Ethiopian Odonata. *Proc. R. ent. Soc. Lond.* (B) **17** : 5–10, 2 figs.

1949. The Zygoptera of Mauritius (Order Odonata). *Trans. R. ent. Soc. Lond.* **100** : 135–146, 3 figs.

1950. *Atoconeura extraordinata*, a new species of Libelluline from Uganda. *Proc. R. ent. Soc. Lond.* (B) **19** : 56–57, 1 fig.

1950a. The Odonata of Mauritius, suborder Anisoptera, and the description of a new species of Zygoptera. *Proc. R. ent. Soc. Lond.* (B) **19** : 70–77, 1 fig.

1951. Notes on Odonata in the Museum Nationale d'Histoire naturelle. With descriptions of a new species and a new Zygopterous nymph. *Revue fr. Ent.* **18** (2) : 93–101, 4 figs.

1952. Notes on African Gomphidae, with descriptions of four new species and a new genus. *Occ. Pap. Coryndon meml Mus.* **3** : 3–12, 4 figs.

1952a. New genera and species of Libellulines from the Belgian Congo. *Revue Zool. Bot. afr.* **48** : 242–256, 4 figs.

1953. Further notes on Samoan Odonata belonging to the Ischnurine complex of species, with descriptions of two new species and some unknown females. *Proc. R. ent. Soc. Lond.* (B) **22** : 119–126, 18 figs.

1953a. Notes on the family Gomphidae, with descriptions of a new species and the female of another. *Proc. R. ent. Soc. Lond.* (B) **22** : 189–194, figs. a–o.

1954. New species of *Macromia* from Tropical Africa. *Revue Zool. Bot. afr.* **49** : 41–76, 4 figs.

1954a. Further notes and descriptions of new species of Libellulidae from Tropical Africa *Revue Zool. Bot. afr.* **50** : 252–268, 2 figs.

1954b. Two new species of *Odonata* from Australia. *Ann. Mag. nat. Hist.* (12) **7** : 145–149, 1 fig.

1955. Odonata. *Explor. Parc Nat. Upemba, I. Miss. de Witte* (1946–1949) fasc. **38** (1) : 1–34, 6 figs. Brussels.

1955a. A new Isostictine Dragonfly from Australia, with some remarks on the subfamily Isostictinae nov. (Odon. Protoneuridae). *Entomologist's mon. Mag.* **91** : 227–230, 1 fig.

1956. A note on the correct habitat of *Rhyothemis chalcoptilon chalcoptilon* (Brauer) (Odonata, Libellulidae). *Entomologist's mon. Mag.* **92** : 326–328, 10 figs.

1956a. A new species of *Diphlebia* (Odonata, Amphipterygidae) from Australia. *Entomologist's mon. Mag.* **92** : 304–305, figs. 1, 5.

1957. A Revision of the Genus *Phyllogomphus* Selys, with descriptions of five new species. *Revue Zool. Bot. afr.* **56** : 9–32, 8 figs.

1960. *Phyllogomphus moundi*, a new species of Odonata from Ibadan, Nigeria, Tropical Africa. *Revue Zool. Bot. afr.* **62** : 141–144, figs. a–i.

1961. *in* Pinhey, *A Survey of the Dragonflies* (*Order Odonata*) *of Eastern Africa.* vii + 214 pp., 11 pls., 2 text-figs. London.

APPENDIX

Location of types not in B.M. (N.H.)

acuminatus, Parogomphus, 1944	Tervuren
adamsi, Archaeophya, 1959	Dobson collection
aequatorialis, Oxythemis, 1954	Tervuren
aethiopia, Elattoneura, 1941	Paris
africana, Neodythemis, 1954	Tervuren
albicauda, Nesolestes, 1952	Paris
albicolor, Nesolestes, 1955	Inst. Rech. Sci. Madagascar
anaci, Notogomphus, 1955	Tervuren
andamanensis, Caconeura, 1924	Originally in Indian Mus.*
andamanensis, Lestes, 1924	Originally in Indian Mus.
andamanensis, Micromerus, 1924	Originally in Indian Mus.
andamanicum, Pseudagrion, 1924	Originally in Indian Mus.
angelicum, Pseudagrion, 1947	Paris
annandalei, Anotogaster, 1924	Originally in Indian Mus.
annandalei, Drepanosticta, 1924	Originally in Indian Mus.
annulatum, Ceriagrion, 1955	Tervuren
annulata, Protosticta, 1926	Leiden
apicalis, Anectothemis, 1954	Tervuren
apicale (Schmidt Mss.), *Pseadagrion*, 1949	Unknown
arnoulti, Neodythemis, 1955	Inst. Rech. Sci. Madagascar
auripennis, Lestes, 1955	Inst. Rech. Sci. Madagascar
auritum, Ceriagrion, 1951	Inst. Rech. Sci. Madagascar
balii, Gomphidia, 1949	Tervuren
basilewskyi, Aethiothemis, 1954	Tervuren
beesoni, Amphiaeschna, 1922	Forest Res. Inst., Dehra Dun, India
berenice, Lokia, 1952	Tervuren
berlandi, Xiphiagrion, 1951	Paris
binocellata, Agriocnemis, 1922	Unknown
bispina, Drepanosticta, 1932	? Brussels
bispina, Malgassophlebia, 1958	Tervuren
bredoi, Trithemis, 1952	Tervuren
calcaris, Argiolestes, 1958	Not stated, ? Dobson coll.
carinata, Idionyx, 1926	Koenigsberg Mus.
carpentieri, Ischnura, 1946	Brussels
cheliferum, Pseudagrion, 1949	Paris
chloroceps, Pseudagrion, 1955	Paris
chromostigma, Ischnura, 1927	Bishop Museum, Honolulu
coerulea, Indolestes, 1924	? Indian Museum

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* The entomological collections were subsequently transferred to Zoological Survey of India, but enquiry revealed that most of these types could not be traced, possibly lost by flood damage during wartime storage.

comorensis, Thermorthemis, 1959	Inst. Rech, Sci. Madagascar
comorensis, Trithemis, 1959	Inst. Rech. Sci. Madagascar
congoensis, Orthetrum, 1949	Inst. Parcs nat. Congo, Brussels
congoliath, Anax, 1953	Tervuren
congolica, Macromia, 1955	Tervuren
conspicuum, Pseudagrion, 1947	Paris
crenulatipennis, Tatocnemis, 1953	Unknown
dahli, Chlorocypha, 1956	Copenhagen, Univ. Mus. Zool.
digitatum (Schmidt Mss), *Pseudagrion*, 1949	Unknown
diplacoides, Sleuthemis, 1957	Paris
dispar (Schmidt Mss), *Pseudagrion*, 1949	Unknown
dissimulans, Lestes, 1955	Tervuren
dobsoni, Gynacantha, 1951	Dobson collection
dorothea, Coenagrion, 1924	? Indian Mus.
drocera, Nesolestes, 1951	Paris
dubitalis, Gomphomacromia, 1939	R. Scottish Mus., Edinburgh
dyeri, Argiocnemis, 1920	Originally in Indian Museum
elongata, Gynacantha, 1957	Tervuren
emarginatipennis, Tatocnemis, 1960	Unknown
exclamationis, Himalagrion, 1919	Originally in Indian Mus.
filosa (Schmidt Mss.), *Ischnura*, 1949	Unknown
flavipes, Gynacantha, 1956	Tervuren
forficuloides, Lestes, 1950	Inst. Rech. Sci. Madagascar
fulvia, Gynacantha, 1926	Leiden
geminata, Caconeura, 1926	Leiden
ghesquierei, Chlorocypha, 1959	Tervuren
goliathus, Anax, 1922	Forest Res. Inst., Dehra Dun.
gracillima, Teinobasis, 1926	Leiden
gravelyi, Argiocnemis, 1920	Originally in Indian Mus.
gregoryi, Anotogaster, 1923	Originally in Indian Mus.
gregoryi, Mnais, 1924	Originally in Indian Mus.
guttifera, Platycnemis, 1950	Paris
hamoni, Aciagrion, 1955	Paris
hamoni, Coenagriou, 1955	Paris
hamoni, Pseudagrion, 1955	Paris
haywardi, Oligoclada, 1947	Inst. Miguel Lillo, Tucuman
henrardi, Elattoneura, 1954	Tervuren
heterosticta, Aciagrion, 1955	Tervuren
hova, Gynacantha, 1956	Paris
igniceps, Pseudagrion, 1953	Paris
igniceps, Pseudagrion, 1953 (preoccupied name, see *chloroceps*)	

immaculifrons, Gynacantha, 1956	Tervuren
imperfecta, Oligocaemia, 1951	Liége Univ. Mus.
inaequistigma, Millotgarion, 1953	Paris
iufumosa, Umma, 1951	Paris
insula, Enallagma, 1920	Originally in Indian Mus.
io, Rhinocypha, 1926	Leiden, (♂ holotype)
javica, Gynacantha, 1926	Leiden, (♀ holotype)
karnyi, Argiolestes, 1926	Leiden, (♂ lectotype)
karnyi, Procordulia, 1926	Leiden (♂ holotype)
kirckhoffae (Schmidt Mss), *Protolestes,* 1949	Unknown
lankanensis, Macrogomphus, 1933	Colombo Mus.
lejeunei-carpentieri, Lithemis, 1951	Liége Univ. Mus
leonorae (Schmidt Mss), *Protolestes,* 1949	Unknown
leopoldi, Neurobasis, 1932	? Brussels
leopoldi, Procordulia, 1932	? Brussels
leucostigma, Disparoneura, 1933	Probably Colombo Mus.
liberiensis, Brachythemis, 1949	IFAN, Dakar
linaenea, Cordulia, 1956	Linnean Soc., London
longistyla, Congothemis, 1959	Tervuren
longiventris, Paragomphus, 1955	Tervuren
lucasi, Leucorrhinia, 1955	Hope Dept. of Entomology, Oxford.
lyratus, Heliogomphus, 1933	Colombo Mus.
maclachlani, Mnais, 1924	Originally in Indian Mus.
madagazureum, Ceriagrion, 1949	Paris
malgassicam, Gynacantha, 1962	Inst. Rech. Sci., Madagascar
malgassica, Nesocordulia, 1956	Inst. Rech. Sci. Madagascar
malgassicum (Schmidt Mss), *Pseudagrion,* 1949	Unknown
merina (Schmidt Mss), *Pseudagrion,* 1949	Unknown
metallica, Parathemis, 1926	Originally in Mus. Zool. Bogoriense, now presumed lost (Lieftinck, i.l., 1965)
milloti, Orthetrum, 1949	Inst. Rech. Sci. Madagascar
milloti, Protolestes, 1949	Inst. Rech. Sci. Madagascar
missionensis, Argia, 1948	Inst. Miguel Lillo, Tucuman
molindica, Chlorocypha, 1948	Tervuren
mortoni, Chlorogomphus, 1936	R. Scottish Mus., Edinburgh
multilineata, Diastatomma, 1949	Tervuren
neophytus, Antipodogomphus, 1958	W. Australia Mus.
neurothemioides, Hemistigma, 1954	Tervuren
obscura, Neurothemis, 1926	Leiden (♂ lectotype)

occidentalis, Macromia, 1954	Paris
pallipes, Aeshna, 1947	Inst. Miguel Lillo, Tucuman
paludinis, Aethiothemis, 1954	Tervuren
pauliani, Neodythemis, 1952	Paris
pauliani, Nesolestes, 1951	Paris
pearsoni, Gomphidia, 1933	Colombo
pinheyi, Platycypha, 1950	Coryndon Mus., Nairobi
platystictoides, Paulianagrion, 1941	Paris
pretentiosa, Zygonyx, 1957	Tervuren
prodigiosa, Zygonyx, 1958	Tervuren
protostictoides, Platycnemis, 1953	Paris
pyriformis, Chlorocypha, 1947	? Paris
radama, Gynacantha, 1956	Location not stated
ranavalonae, Zygonyx, 1949	Paris
rasoherinae, Phaon, 1949	Paris
renaudi, Pseudagrion, 1953	Paris
renei, Crenigomphus, 1936	Paris
reticulata, Gynacantha, 1926	Leiden (♂ holotype)
reuniense, Coenargiocnemis, 1957	Inst. Rech. Sci. Madagascar
robusta, Drepanosticta, 1926	Leiden (♀ holotype)
rodericki, Micromidia, 1959	Dobson collection
rubellocerinum, Ceriagrion, 1947	Paris
sanguinostigma, Ceriagrion, 1955	Tervuren
schoutedeni, Macromia, 1954	Tervuren
schoutedeni, Macrogomphus, 1949	Tervuren
schoutedeni, Phyllogomphus, 1957	Tervuren
selysi, Heliogomphus, 1925	Brussels
selysi, Idionyx, 1926	Brussels
septemflavum, Onychogomphus, 1955	Inst. Parcs nat. Congo, Brussels
seydeli, Chlorocypha, 1955	Tervuren
seydeli, Macromia, 1954	Tervuren
sicilicus, Cordulegaster, 1929	Brussels
siebersi, Drepanosticta, 1926	Leiden (♂ lectotype)
spirillus, Leptogomphus, 1922	Originally in Indian Mus.
splendens, Rhyothemis, 1955	Tervuren
straeleni, Chlorocypha, 1949	Brussels
stygia, Agriocnemis, 1954	Tervuren
subtropicalis, Macromia, 1954	Tervuren
superbum, Pseudagrion, 1956	Tervuren
thenartum, Pseudagrion, 1956	Tervuren
tillyardi, Synlestes, 1948	Brussels
tinctipennis, Pseudagrion, 1957	Inst. Rech. Sci. Madagascar
trithemoides, Porpacithemis, 1958	Tervuren
tropicana, Trithemis, 1952	Tervuren

tuberculicollis (Schmidt Mss), *Nesolestes*, 1949	Unknown
umbrosa, Zygonyx, 1957	Tervuren
uncatus, Cyanogomphus, 1947	Inst. Miguel Lillo, Tucuman
ungulatum, Pseudagrion, 1951	Inst. Rech. Sci. Madagascar
unifasciata, Macromia, 1954	Inst. Parcs nat. Congo, Brussels
villiersi, Ceriagrion, 1951	Paris
villiersi, Oxythemis, 1951	IFAN, Dakar
villiersi, Prodasineura, 1948	IFAN, Dakar
viridifrons, Gynacanthaeschna, 1922	Forest Res. Inst., Dehra Dun.
viridivittata, Aeshna, 1947	Inst. Miguel Lillo, Tucuman
vridaghi, Elattoneura, 1954	Tervuren
vrydaghi, Orthetrum, 1954	Tervuren
williamsoni, Burmagomphus, 1926	Ann Arbor Mus., Michigan
willinki, Macrothemis, 1947	Inst. Miguel Lillo, Tucuman
willinki, Telebasis, 1948	Inst. Miguel Lillo
wittei, Aeshna, 1955	Inst. Parcs nat. Congo, Brussels
wittei, Chlorocnemis, 1953	Inst. Parcs nat. Congo, Brussels
wittei, Chlorocypha, 1958	Inst. Parcs nat. Congo, Brussels
wittei, Pseudagrion, 1949	Inst. Parcs nat. Congo, Brussels
xerophilus, Onychogomphus, 1956	? Paris
yunnanensis, Brachydiplax, 1924	? Indian Mus.
z-viridulum, Paragomphus, 1955	Inst. Rech. Sci. Madagascar

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REVISION OF THE GENUS *OROSIUS* DISTANT (HOMOPTERA : CICADELLOIDEA)

M. S. K. GHAURI

BULLETIN OF
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ENTOMOLOGY Vol. 18 No. 7
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REVISION OF THE GENUS *OROSIUS* DISTANT (HOMOPTERA : CICADELLOIDEA)

BY

M. S. K. GHAURI X11
Commonwealth Institute of Entomology, London

Pp. 229–252 ; 11 *Text-figures*

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TRUSTEES OF
THE BRITISH MUSEUM (NATURAL HISTORY)

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REVISION OF THE GENUS *OROSIUS* DISTANT (HOMOPTERA : CICADELLOIDEA)

BY

By M. S. K. GHAURI

SYNOPSIS

The genera *Orosius* Distant and *Nesophrosyne* Kirkaldy are redefined and their status established. Species of *Orosius* are redescribed and illustrated. A new species of *Orosius* is described.

MEMBERS of the genus *Orosius* Distant (1918*b* : 85) have been recognized as serious virus vectors affecting economic plants in many parts of the world; causing considerable losses to sesamum (*Sesamum orientale* L.) in India (Vasudeva & Sahambi, 1955 and 1958), and to tomato, tobacco and lucerne in Australia (Helson, 1951*a* and Heinze, 1951 : 33). In India alone, the loss to sesamum through Phyllody has been estimated by Vasudeva & Sahambi (1958) as more than three and a half million pounds sterling per year. The same authors found several other crops, winter oilseeds (*Brassica* spp.), sanhemp (*Crotalaria juncea* L.), gram (*Cicer orientum* L.), berseem (*Trifolium alexandrium*) and many others, susceptible to the virus disease carried by the same vector. The importance of *Orosius argentatus* (Evans, 1938*b* : 15) was recognized even earlier (vide Oman, 1949*a* : 11) as virus vector of tomato big bud and tobacco yellow dwarf.

In spite of their economic importance, the identity of the virus vectors belonging to this group was not clearly understood. Thus they have been known by different names, *Nesaloha cantonis* Oman (1943*b* : 33), *Deltocephalus* sp. (Vasudeva & Sahambi, 1958), *Orosius argentatus* (Evans, 1938*b*) (Day & McKinnon, 1951) and *Nesophrosyne* (*Orosius*) *lotophagorum* Kirkaldy (Linnavuori, 1960*a* : 56). Evans (*in litt.*) has expressed doubt as to whether differences between these should be regarded as of specific significance. Other species, such as *Orosius albicinctus* Distant (1918*b* : 85), *Thamnotettix cellulosa* Lindberg (1927*c* : 90), *Thamnotettix filigranus* Haupt (1927*a* : 30), *Thamnotettix canberrensis* Evans (1938*b* : 15) and *Orosius maculatus* Singh-Pruthi (1930*a* : 67) are also involved. There was, thus, a need for re-describing various species as well as for establishing their correct generic relationships.

Distant (1918*b* : 85) described *Orosius*, with *Orosius albicinctus* Distant as the type-species by monotypy. Later only two other species were described in *Orosius*. These are *Orosius maculatus* Pruthi (1930*a* : 67) and *Orosius santali* Pruthi (1934*a* : 25). *Orosius maculatus* Pruthi has been designated the type-species of *Pruthiorosius* by the writer (Ghauri, 1964 : 559). *Orosius santali* Pruthi was not available for the present study. Haupt (1927*a* : 30, *T. filigranus*) and Lindberg (1927*c* : 90, *T. cellulosa*) described one species each under *Thamnotettix* and Evans (1938*b* : 15) added two more species *T. argentatus* and *T. canberrensis*. Oman (1943*b* : 33) described another species *Nesaloha cantonis*, referable to *Orosius*. Oman (1949*a* :

11, 15) transferred *T. argentatus* Evans to *Orosius* and said that this species occurs on many central Pacific islands, the Philippines and Malaya in addition to Australia. He further thought that it was unlikely that the species was native to Australia, but was probably introduced there from India and that it might be the same as one of the species described by Distant or Pruthi from India. Dlabola (1952*b* : 34) transferred *T. filigranus* Haupt from *Thamnotettix* to *Orosius*. During 1955 the Indian *Orosius* sp. damaging sesamum was called *Deltocephalus* sp. (Vasudeva & Sahambi, 1955 : 126). Lindberg (1958 : 176) transferred his species *T. cellulosa* from *Thamnotettix* to *Nesophrosyne* and added Cape Verde Island to the original distribution (Sudan) of this species. Linnavuori (1960 : 320) synonymized *Orosius* Distant and *Nesaloha* Oman with *Nesophrosyne* Kirkaldy (1907*h* : 160) as well as transferring *O. argentatus* (Evans) from *Orosius* to *Nesophrosyne*. He also described a new variety, *Nesophrosyne argentatus* var. *distans* (p. 322). Soon after, Linnavuori (1960*a* : 56) considered *Orosius* Distant as only a subgenus of *Nesophrosyne* and also synonymized *O. argentatus* (Evans) with *Allygus lotophagorum* Kirkaldy (1907*d* : 62), transferring the latter from *Allygus* to *Nesophrosyne*. In both of his studies (1960 : 321 and 1960*a* : 56) the figures of male genitalia belong to *O. lotophagorum* (Kirk.), but the comparative remarks about the external appearance (1960 : 322) apply to *O. argentatus* (considered by him as the nominate form) and *O. lotophagorum* (Kirk.). The variety *N. argentatus distans* Linnavuori proved to be *O. lotophagorum* (Kirk.). Emeljanov (1962) accepted the synonymy *Nesophrosyne* Kirkaldy (= *Orosius* Distant) and included these with other genera, *Hishimonus* Ishihara (1953*b* : 11 and 38), *Satsumanus* Ishihara (1953*a* : 193) *Nesophryne* Kirkaldy (1907*h* : 160), *Nicolaus* Lindberg (1958 : 176), *Navaia* Linnavuori (1960*a* : 52) and *Opsianus* Linnavuori (1960 : 316) in the Subtribe *Opsiina* Em. of the Tribe *Opsiini* Em. However, the definition of the Subtribe *Opsiina* does not seem to hold good if the character of the eye is taken into account. The " hollow " is present in the type of *O. albicinctus* Distant whereas it is absent in the type of *Nesophrosyne perkinsi* Kirkaldy and the type of *Hishimonus* (= *Eutettix*) *disciguttus* Walker (1957*b* : 172 as *Acocephala*) ; all three species being the type-species of their respective genera.

This work would not have been accomplished without the help rendered by the following persons and institutions. The writer takes this opportunity to acknowledge with grateful thanks their assistance for making available material for this study. Dr. J. W. Evans, Director of the Australian Museum, Sydney, Australia ; The Director, Zoological Survey of India, Calcutta ; Dr. J. P. Kramer and Dr. J. F. Clarke, U.S. National Museum, Washington, D.C., U.S.A. ; Bernice P. Bishop Museum, Honolulu, Hawaii ; Dr. R. Linnavuori, Finland ; Dr. H. J. Muller, Quedlindburg, East Germany ; Dr. E. Swirski, The Hebrew University, Israel. The writer's warmest thanks are tendered to Mr. J. P. Doncaster, Keeper of the Department of Entomology in the British Museum (Natural History), London, for the facilities provided for studying the types of several species of Cicadellidae in the collection of the Museum.

The writer suspects that *Thamnotettix puellus* Melichar (1911*a* : 106) might belong to *Orosius*, but as the type could not be traced either at Museum National d'Histoire

Naturelle, Entomologie, Paris, or at Moravské Museum, Brno, this cannot be decided definitely. Help given by Dr. A. Villiers of the Museum National, Paris and Dr. J. Stehlik, of Moravské Museum, Brno, in establishing the fact that the type of *T. puellus* Melichar is untraceable is gratefully acknowledged.

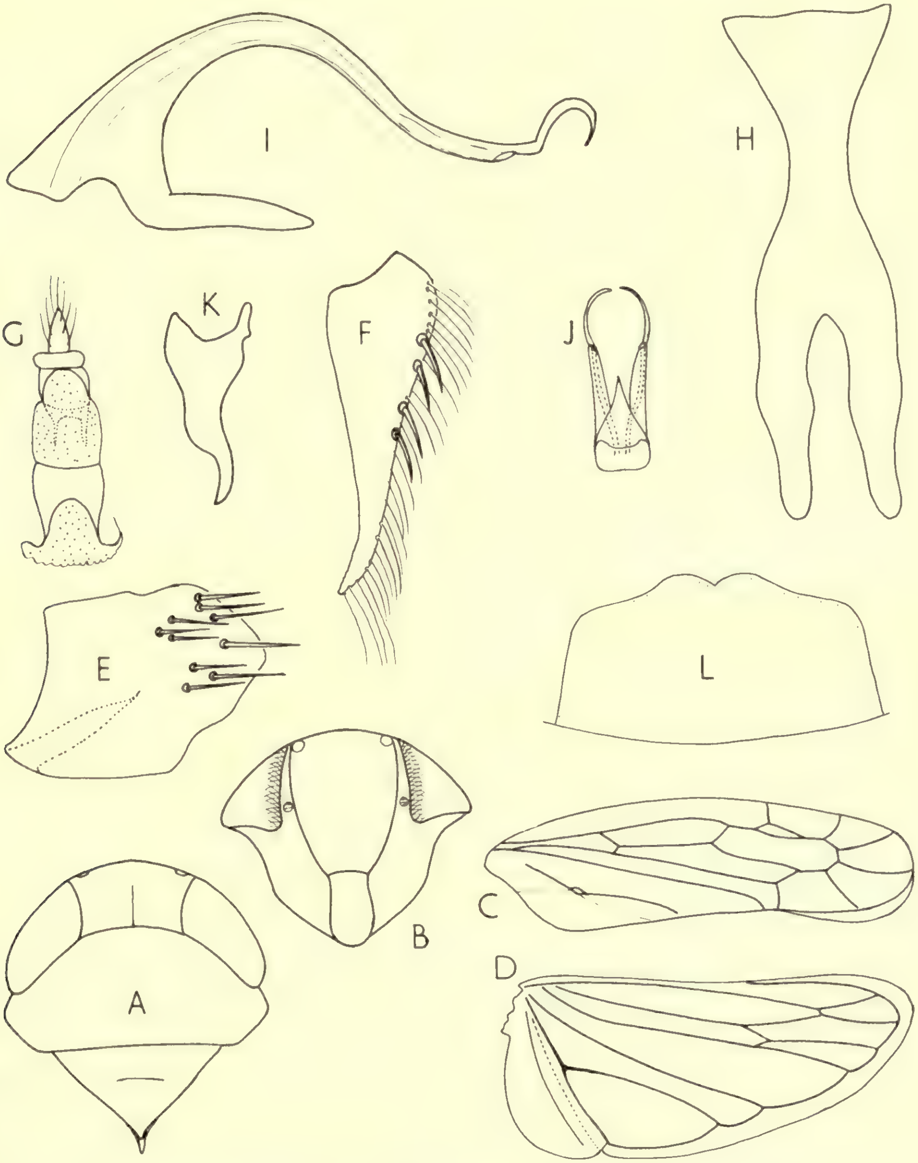

FIG. 1. *Nesophrosyne perkinsi* (Kirkaldy). Holotype ♂ and paratype ♀; for explanation of figures, see p. 252.

NESOPHROSYNE Kirkaldy

(Text-fig. 1)

Nesophrosyne Kirkaldy, 1907*h* : 160.

Type-species : *Eutettix perkinsi* Kirkaldy, 1904*a* : 178.

Moderately robust leaf-hoppers with pale yellow body colour.

Head : vertex with anterior and posterior margins subparallel, *frons* proportionately broader, width equal to about three-fourths of length, lateral margins not sinuate ; *clypeus* with lateral margins subparallel, elongate ; *eyes* without " hollow " next to base of antennae ; *ocelli* on junction of vertex and frons, visible dorsally as well as ventrally.

Pronotum : as wide as head, with anterior margin convex and posterior margin straight, lateral margins angled ; *scutellum* wider at base than median length ; *tegmen* appendiculate, claval veins branches not well defined, external subapical cell petiolate on both ends, internal subapical cell narrowed in middle ; *wing* with typical Deltocephaline venation as shown in Text-fig. 1.

♂ genitalia and anal tube : pygofers with fewer (about 10) macrosetae located on posterior half of lateral lobe, setae nearer margin extended beyond it ; *subgenital plates* elongate triangular, anteriorly broad, posteriorly gently narrowed, not ending in a finger-like process, external margin with four or five macrosetae and numerous fine and long hair-like setae ; *basal plate* more or less " Y "-shaped, apex wide, visibly separated from arms by a narrow stem, arms almost parallel ; *parameres* with well developed apodeme, apex produced but not hooked ; *aedeagus* with two gonopores, base pear-shaped, posteriorly produced on dorsal side to join anal tube, two-branched, branches converging, each arising independently from base and carrying a passage opening through a gonopore beyond which apex of branch is produced as a narrow, hooked process ; *anal tube* very long, dorsally not entirely membranous, with a wide, well sclerotized band, laterally and ventrally sclerotized.

OROSIUS Distant

(Text-fig. 2)

Orosius Distant, 1918*b* : 85.

Type-species : *Orosius albicinctus* Distant, 1918*b* : 85.

Small leaf-hoppers, usually with irregular transverse series of small dark brown spots, markings and striations on head, thorax and tegmen giving a filigreed aspect to the whole coloration.

Head : vertex, shape variable within certain limits, from a condition with anterior and posterior margins subparallel to one where anterior margin is conically produced, gently but narrowly curving into frons ; *frons* proportionately narrow, width never more than five-eighths of length, with sides usually sinuate in middle, moderately convex ; *clypeus* with subparallel sides, elongate; *eyes* with " hollow " near base of antennae ; *ocelli* located on border between vertex and frons, visible on dorsal side, on vertex as well as on ventral side on frons.

Pronotum : as wide as head, anterior margin convex, basal margin straight or only gently concave, lateral margins not straight, gently angled ; *scutellum* wider at base than median length ; *tegmen* appendiculate, *clavus* with branched claval vein, external subapical cell never petiolate on both ends, internal subapical cell narrowed in middle ; *wing* with typical Deltocephaline venation as shown in Text-fig. 2.

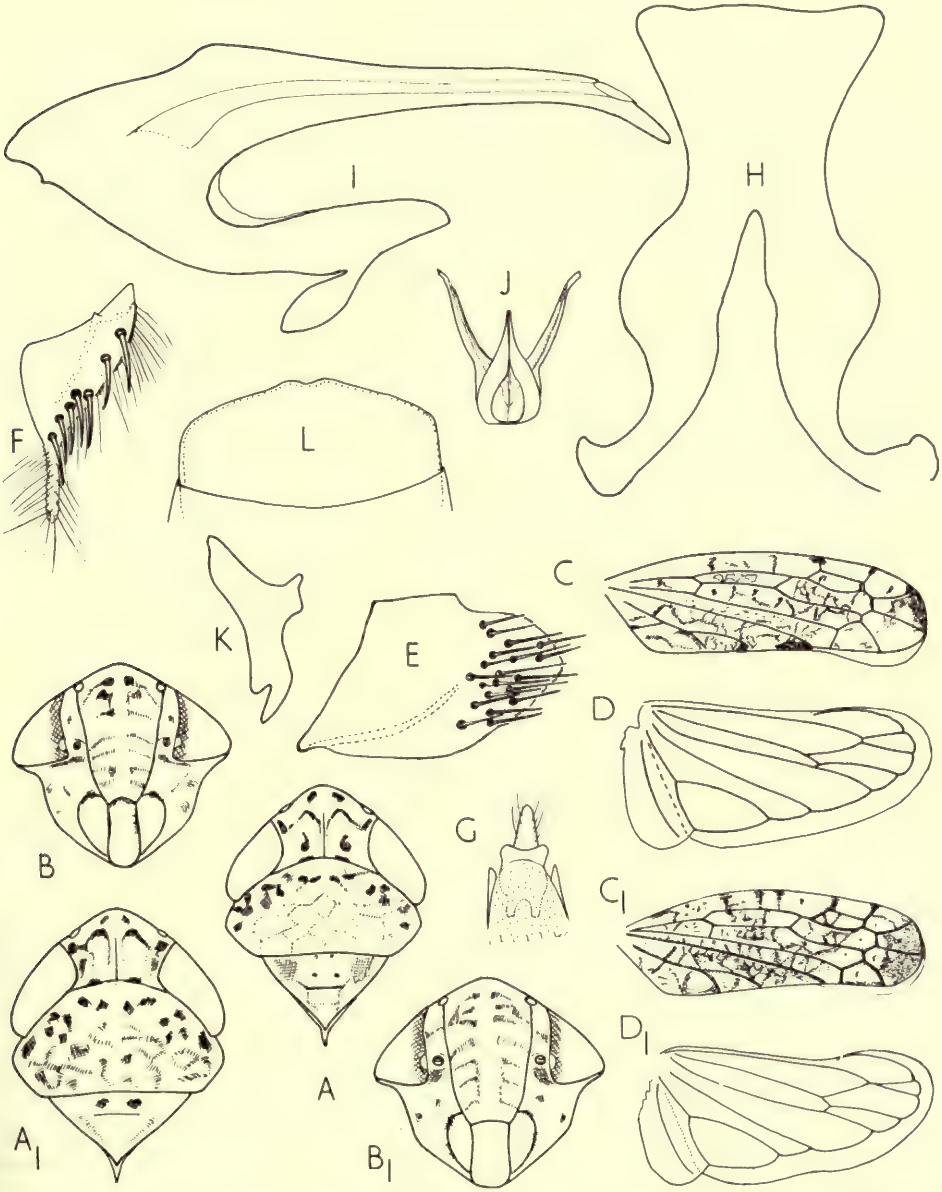
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FIG. 2. *Orosius albicinctus* Distant. Holotype ♀ and Indian ♂; A_1, B_1, C_1, D_1 and L belong to holotype female, the remaining to Indian male; for explanation of figures, see p. 252.

♂ genitalia and anal tube : pygofers with several (11–20) moderately long macrosetae located on posterior half of lateral lobes, setae not arranged in regular rows, apices of those farthest behind extended beyond posterior margin of pygofers ; *subgenital plates* triangular, basally broad, posterior half abruptly narrowed and produced in a finger-like process, external margin with a row of 5–8 macrosetae, limited to only anterior broader part, and numerous fine and very long hair-like setae covering entire external margin of subgenital plate as well as internal margin of finger-like process ; *basal plate* more or less " Y "-shaped with narrow or broad apex, sometimes very short and in form of a " U " rather than a " Y ", arms subparallel or diverging ; *paramere* with well developed apodeme, apex more or less hooked ; *aedeagus* with two gonopores, base pear-shaped, produced posteriorly on dorsal side where it is joined to anal tube, two-branched, branches parallel or diverging or slightly converging, each branch arising independently from base carrying a passage opening through a gonopore beyond which apex of branch, in some species, is narrowly produced but never hooked ; *anal tube* of moderate length, basally membranous, except in some specimens where there is a very weakly sclerotized dorsal narrow stripe, on lateral and ventral sides sclerotized.

Orosius very closely resembles *Nesophrosyne*, but the structure of anal tube, shape of subgenital plate and to some extent the shape of frons, paramere and that of aedeagus separate the two genera. The anal tube in *Nesophrosyne* is dorsally partly sclerotized, whereas in *Orosius* it is almost entirely membranous, posteriorly the subgenital plate is not narrowed in form of a finger in *Nesophrosyne* as it is in *Orosius*, the hooked process at the apex of each branch of aedeagus is only present in *Nesophrosyne perkinsi*. These differences, apart from some minor ones in venation and the shape of the paramere, are sufficient for regarding *Nesophrosyne* and *Orosius* as two distinct genera.

Orosius albicinctus Distant

(Text-figs. 2, 3)

Orosius albicinctus Distant, 1918*b* : 85.
Thamnotettix filigranus Haupt, 1927*a* : 30. **syn. n.**

Coloration : body pale ochraceous with dark brown and black mottlings and irregular striations ; vertex with two spots near anterior margin, two similar spots near posterior margin, two near inner margin of each eye and a curved line in form of an irregular inverted " V " on each side of median line, dark brown ; eyes dark brown ; ocelli yellowish red ; frons with transverse dark striations ; irregular dark markings on other parts of face ; pronotum with a series of dark spots near anterior margin and a network of dark striations on disc ; scutellum with two dark prominent black spots near base in addition to a few more irregular dark markings ; remaining parts of thorax above black ; on ventral side pale ochraceous with dark spots ; tegmen greyish white with prominent black spots near costal, apical and posterior margins and irregular criss-cross dark striation covering whole surface ; legs pale ochraceous with black spots on all segments ; abdomen above and below black with pale ochraceous margins marked with dark spots ; genital segments in both sexes pale ochraceous with very few faintly dark brown markings. In ♂, markings are darker than in ♀.

MEASUREMENTS in mm.

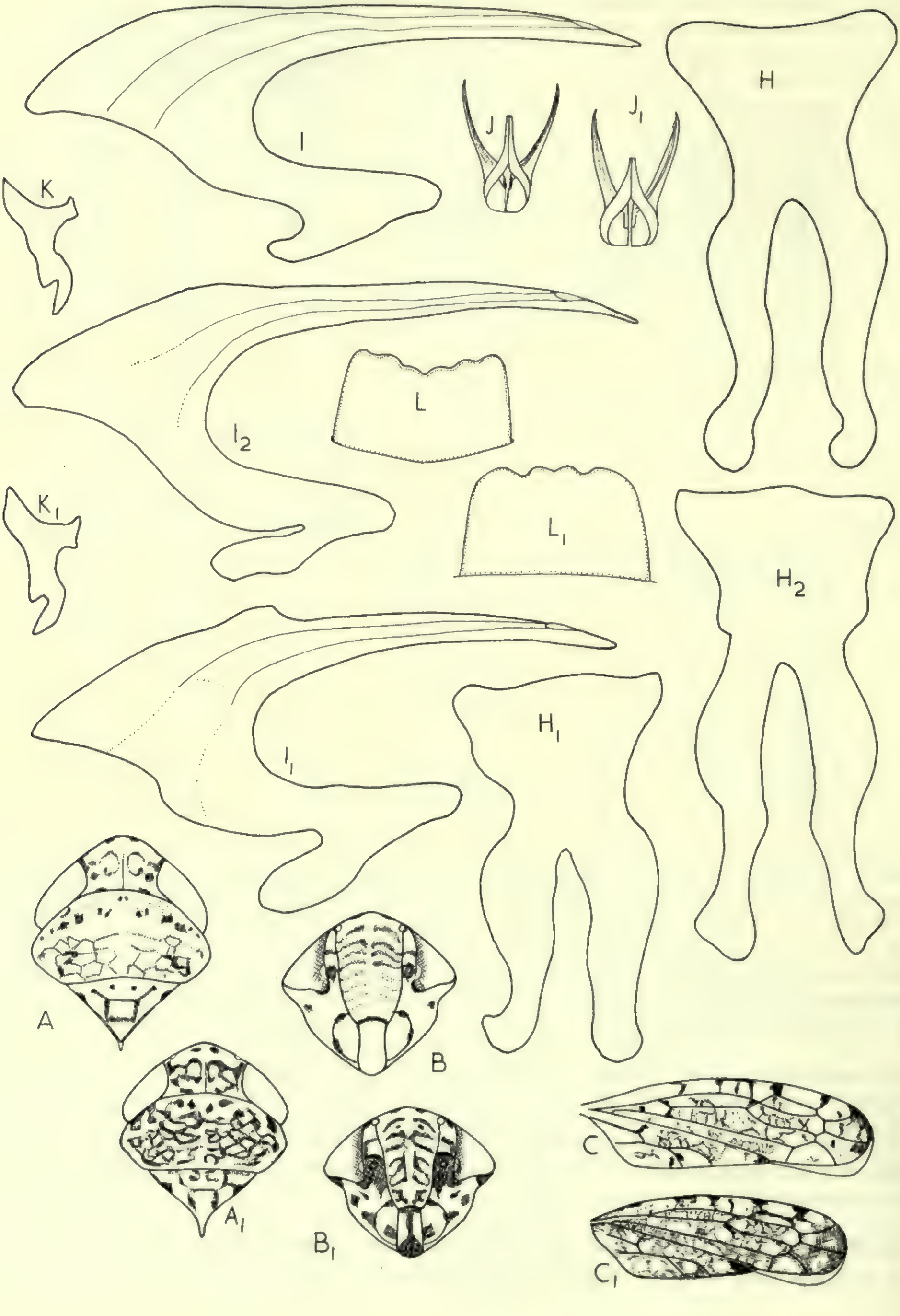
		Females		
	Indian	Middle Eastern and African		
	Holotype of *O. albicinctus*	Holotype of *T. filigranus*	From Egypt	From Uganda
Width across eyes	0·81–0·88	0·86	0·92	0·91
Width between eyes	0·31–0·37	0·34	0·37	0·38
Median length of vertex	0·27–0·29	0·28	0·30	0·32
Length of frons	0·55–0·55	0·59	0·59	0·61
Maximum width of frons	0·34–0·37	0·36	0·41	0·41
Width of pronotum	0·81–0·88	0·88	0·92	0·91
Median length of pronotum	0·41–0·43	0·44	0·47	0·47
Width at base of scutellum	0·47–0·47	0·47	0·51	0·54
Median length of scutellum	0·30–0·34	0·34	0·35	0·37
Length of tegmen	2·05–2·63	2·58	2·66	2·66
Body length	2·63–3·21	3·21	3·29	3·29

		Males		
	Indian	Middle Eastern and African		
		Topotypic of *T. filigranus*	From Egypt	From Uganda
Width across eyes	0·78–0·79	0·81	0·84	0·81
Width between eyes	0·31–0·34	0·32	0·34	0·34
Median length of vertex	0·27–0·25	0·27	0·27	0·27
Length of frons	0·49–0·49	0·54	0·52	0·51
Maximum width of frons	0·34–0·34	0·34	0·32	0·34
Width of pronotum	0·78–0·78	0·81	0·84	0·84
Median length of pronotum	0·37–0·40	0·44	0·43	0·42
Width at base of scutellum	0·47–0·42	0·44	0·43	0·45
Median length of scutellum	0·30–0·30	0·32	0·34	0·32
Length of tegmen	2·23–2·23	2·37	2·37	2·37
Body length	2·71–2·82	2·90	2·90	2·90

Tegmen with appendix wide. Pygofers with numerous setae. Basal plate with apex broadly triangular and arms sub-parallel or diverging; aedeagus with diverging branches whose apices in some specimens turn further outwards; other parts of male genitalia as figured; ♀ VII sternum, posterior margin not very constant in outline, but always with a central notch, laterally more or less sinuate as figured. In a large collection of females from Rajasthan, India, it was noticed that those females which had not oviposited showed only the median emargination in the posterior margin of the VII sternum, but others which had started oviposting, the lateral notches, in addition to the median one, were present.

Material examined. INDIA: The holotype ♀ of *O. albicinctus* is from Kodaikanal, S. India, B.M. (N.H.). It has been possible to match other specimens from Delhi, both ♀ and ♂, with the holotype. Rajasthan, Jaipur, at light, ♂, ♀, 12.vi.65, *Dept. Agric.*, B.M. (N.H.); New Delhi, on *Sesamum orientale* L., ♂, ♀, ix–x.1954 (*H. S. Sahambi*).

PALESTINE: ♀ holotype of *Thamnotettix filigranus* Haupt, Ben-Shemen, 7–8.v.1926, det. Haupt, *Hpt.*, [on loan from Dr. J. H. Muller, Quedlindburg, E.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Germany]; 372 (5), Rahovet, 1 ♂, 28.vii.1957 (*Michaeli*) [presented to B.M. (N.H.) by Dr. E. Swirski, The Hebrew University, Israel]; Jericho, at light, ♂, ♀, 16.vii.1929 (*J. Tapukhi*), B.M. (N.H.).

EGYPT: Giza, on Cotton, ♂, ♀, v–vi.1961; Siwa, ♂, ♀, 8, 15, 28.v.1935 (*J. Omer Cooper*), Armstrong College Exped., B.M. (N.H.).

UGANDA: Kampala, on Sim-Sim, 1 ♂, 1 ♀, 21.vii.1933 (*H. Hargreaves*), B.M. (N.H.).

Recently Linnavuori (1964: 336, 350) recorded *N.* (*O.*) *filigranus* (Haupt) from Egypt and considered it to be of Eremian origin. As is shown here *Orosius filigranus* (Haupt) is a synonym of *O. albicinctus* Dist. and has a much wider distribution including the Oriental region.

Although the ♀ holotype of *O. albicinctus* is smaller than the ♀ holotype of *T. filigranus*, other ♀ and ♂ from India are not much smaller than those from the Middle East and Africa (vide Table, p. 237). In addition to size, there is some variation in colour also, e.g., both ♂ and ♀ from Uganda show darkening of pattern, especially on the head and the tegmen (vide A_1, B_1, and C_1, Text-fig. 3). Since the ♂ genitalia do not show appreciable differences, all the specimens from various localities studied here are considered to belong to *O. albicinctus* Distant.

Orosius cellulosa (Lindberg)

(Text-fig. 4)

Thamnotettix cellulosa Lindberg, 1927*c*: 90.
Nesophrosyne cellulosa (Lindberg), 1958: 176.

Coloration: very similar to *O. albicinctus* Distant; vertex and pronotum with fewer dark markings, frons and other parts of face with faint markings; vertex, face and legs with red spots.

Measurements in mm. of ♂ and (♀): head, width across eyes 0·79 (♀ 0·88), width between eyes 0·29 (0·31), median length of vertex 0·26 (0·31), length of frons 0·51 (0·57), maximum width of frons 0·37 (0·38); width of pronotum 0·74 (0·88), median length of pronotum 0·41 (0·47), width at base of scutellum 0·46 (0·51), median length of scutellum 0·30 (0·34), length of tegmen 2·23 (2·50); body length 2·76 (3·02).

Tegmen with wide appendix; pygofers with about 13 setae; basal plate with rectangularly narrow apex and slightly diverging long arms; aedeagus with subparallel lateral branches which curve inwards apically, sinuate in lateral view; other parts of ♂ genitalia as figured; ♀ VII sternum, posterior margin convex with a central depression.

Material examined. BRITISH SUDAN: Paratypes, Khartoum, sucking human blood, 1 ♂, 1 ♀, 17.ix.24 (*Well. T. R. Labs.*), in B.M. (N.H.).

Superficially *O. cellulosa* resembles *O. albicinctus*, but the shape of basal plate and the aedeagus are sufficient to differentiate it from the latter. The rectangular apex

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FIG. 3. *Orosius albicinctus* Distant. Geographical variation. Holotype ♀ and topotypic ♂ of *T. filigranus* Haupt (a synonym of *O. albicinctus*), ♂ and ♀ from Uganda and ♂ from Egypt of *O. albicinctus*. A, B, C and L belong to holotype ♀; H, I, J and K to topotypic ♂; A_1, B_1, C_1, H_1, I_1, J_1 and K_1 to ♂ and L_1 to ♀ from Uganda; H_2 and I_2 to ♂ from Egypt. For explanation of figures, see p. 252.

of basal plate and the subparallel lateral branches of the aedeagus bring it very close to the Far Eastern species, *O. argentatus* (Evans) and others, but the sinuate shape of lateral branches of the aedeagus of *O. cellulosa* is different from all others.

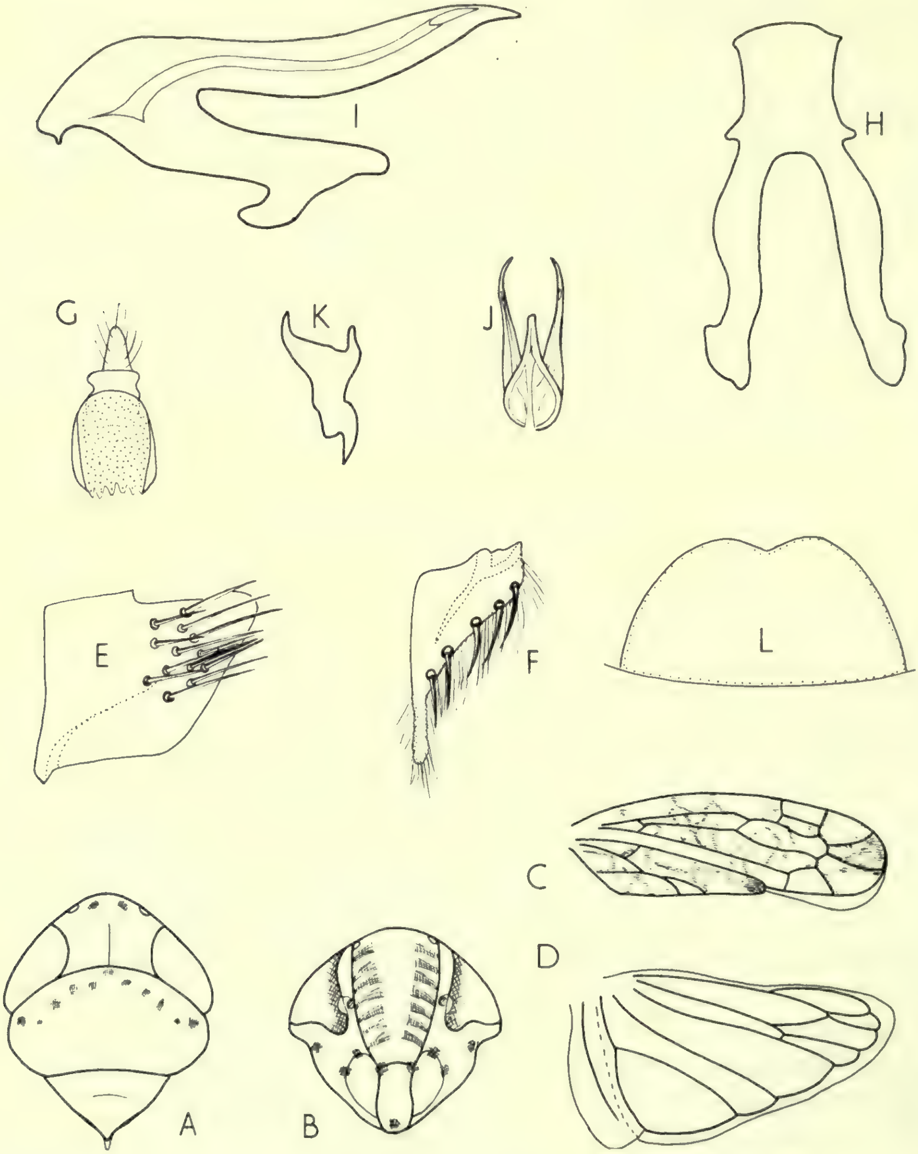

FIG. 4. *Orosius cellulosa* (Lindberg). Paratype ♂ and ♀; for explanation of figures, see p. 252.

Orosius lotophagorum (Kirkaldy)

(Text-fig. 5)

Allygus lotophagorum Kirkaldy, 1907*d* : 62.
Nesophrosyne (*Orosius*) *lotophagorum* (Kirkaldy) Linnavuori, 1960*a* : 57.
Thamnotettix argentatus Evans ; Linnavuori, 1960*a* : 57.
Nesophrosyne argentatus (Evans) ; Linnavuori, 1960 : 320.
Nesophrosyne argentatus var. *distans* Linnavuori, 1960 : 322. **syn. *n*.**

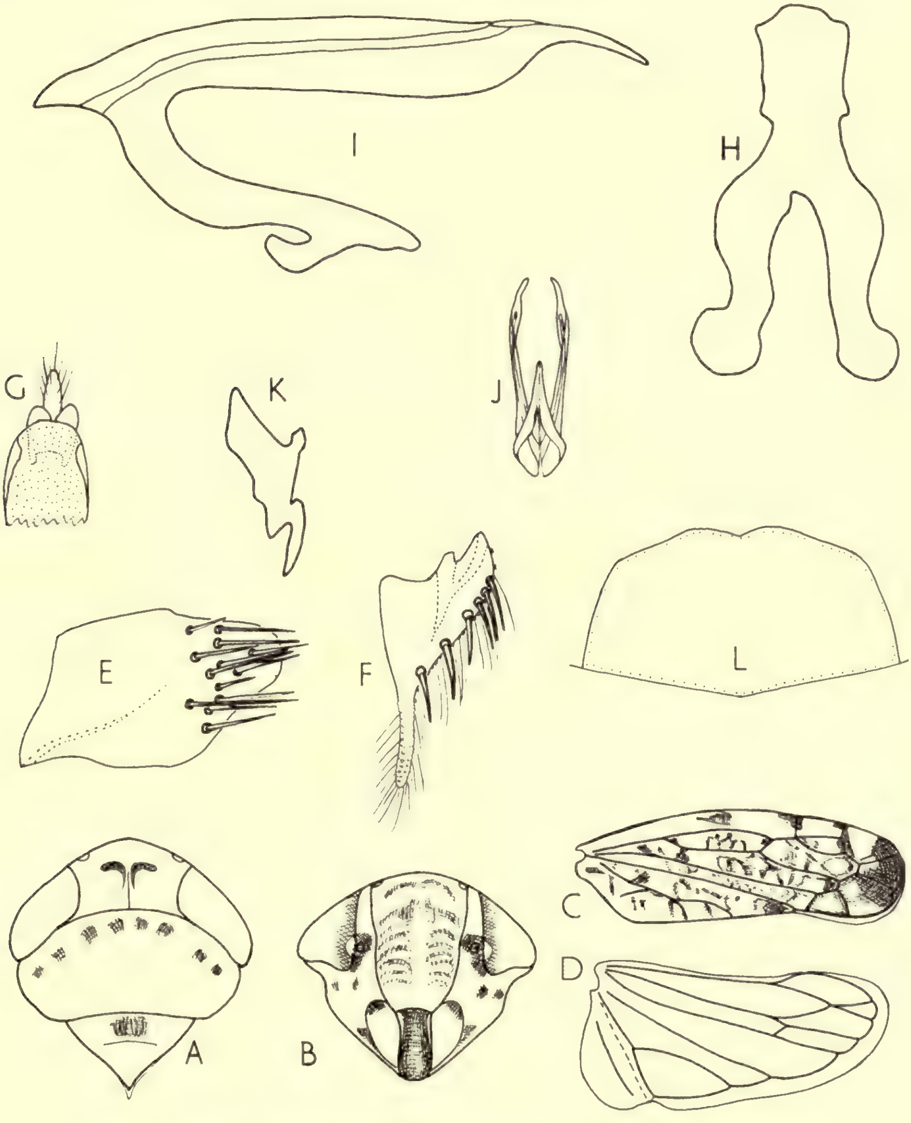

FIG. 5. *Orosius lotophagorum* (Kirkaldy). ♂ and ♀ ; for explanation of figures, see p. 252.

Coloration : basically of the same pattern as that of *O. albicinctus* Distant ; individuals showing light to dark and more or less extensive markings ; ocelli red.

Measurements in mm. of male and (♀) : head, width across eyes 1·00 (0·98–1·10), width between eyes 0·36 (0·34–0·41), median length of vertex 0·29–0·300 (0·32–0·34), length of frons 0·55 (0·57–0·58), maximum width of frons 0·42 (0·41–0·44) ; width of pronotum 0·95 (0·88–0·95), median length of pronotum 0·42–0·44 (0·44), width at base of scutellum 0·54–0·56 (0·57), median length of scutellum 0·35–0·37 (0·35–0·36), length of tegmen 2·31 (2·50) ; body length 3·00 (3·10).

Body robust, this difference appreciable from *O. albicinctus* Distant ; tegmen with very narrow appendix ; pygofers with numerous setae ; basal plate with rectangularly narrow apex and subparallel arms ; aedeagus with lateral branches subparallel, their apices turned inwards, in lateral view the shaft wide for most of its length, but abruptly narrowed and drawn out in form of a long process beyond gonopore ; other parts of ♂ genitalia as figured. ♀ VII sternum, hind margin convex with a shallow depression in centre and slight depressions on sides of latter.

Material examined. FIJI : Ovalau 1 ♂, 2 ♀, 19.x.24 (*E. H. Bryan Jr.*), det. as *Nesophrosyne argentatus distans* Linnavuori, Bishop Museum Honolulu, Hawaii.

WAKE IS. : Sesuvium, ♂, ♀, 28.vii.23 and 30.vii.23, (*E. H. Bryan Jr.*), some det. as *Nesophrosyne argentatus distans* Linnavuori, Bishop Museum, Honolulu, Hawaii and from Dr. R. Linnavuori, Finland.

O. lotophagorum Kirkaldy resembles other members of the genus *Orosius* superficially and sometimes has been confused with *O. argentatus* (Evans) but its body, especially the head and the pronotum, are appreciably robust compared with the more or less slender form of *O. argentatus.* The appendix of its tegmen on the other hand is the narrowest amongst the species of the genus *Orosius.* Internally, the most characteristic feature of *O. lotophagorum* is the shape of its aedeagus ; viewed laterally the sudden narrowing of its apex should be sufficient to distinguish it from all other species.

Orosius argentatus (Evans)

(Text-fig. 6)

Thamnotettix argentatus Evans, 1938*b* : 15.
Thamnotettix argentatus Evans ; Evans, 1940*c* : 3 and 11.
Orosius argentatus (Evans) Oman, 1949a : 11.

Coloration : general colour pattern similar to *O. albicinctus* Distant, dark brown markings more pronounced on head, thorax and abdomen. Ocelli reddish in colour.

Measurements in mm. of ♂ and (♀) *:* head, width across eyes 0·78–0·81 (0·88–0·91), width between eyes 0·30–0·34 (0·35–0·37), median length of vertex 0·24–0·26 (0·25–0·28), length of frons 0·47 (0·54), maximum width of frons 0·34 (0·35–0·38) ; width of pronotum 0·78–0·81 (0·86–0·88), median length of pronotum 0·40–0·41 (0·41–0·44), width at base of scutellum 0·42–0·47 (0·43–0·49), median length of scutellum 0·30 (0·30–0·34), length of tegmen 2·10–2·21 (2·37–2·76) ; length of body 2·63–2·74 (2·90–3·29).

O. argentatus is more delicate than its two sympatric species, *O. lotophagorum* (Kirkaldy) and *O. canberrensis* (Evans). Tegmen with wide appendix ; pygofers with numerous setae ; basal plate with rectangularly narrow apex and almost parallel arms ; aedeagus with lateral arms almost parallel to each other, with their apices curving inwards, in lateral view gradually narrowed, without terminal process, other parts of ♂ genitalia as figured ; ♀ VII sternum, hind margin more or less similar to that of *O. filigranus* Haupt holotype ♀, as shown in Text-fig. 6, L.

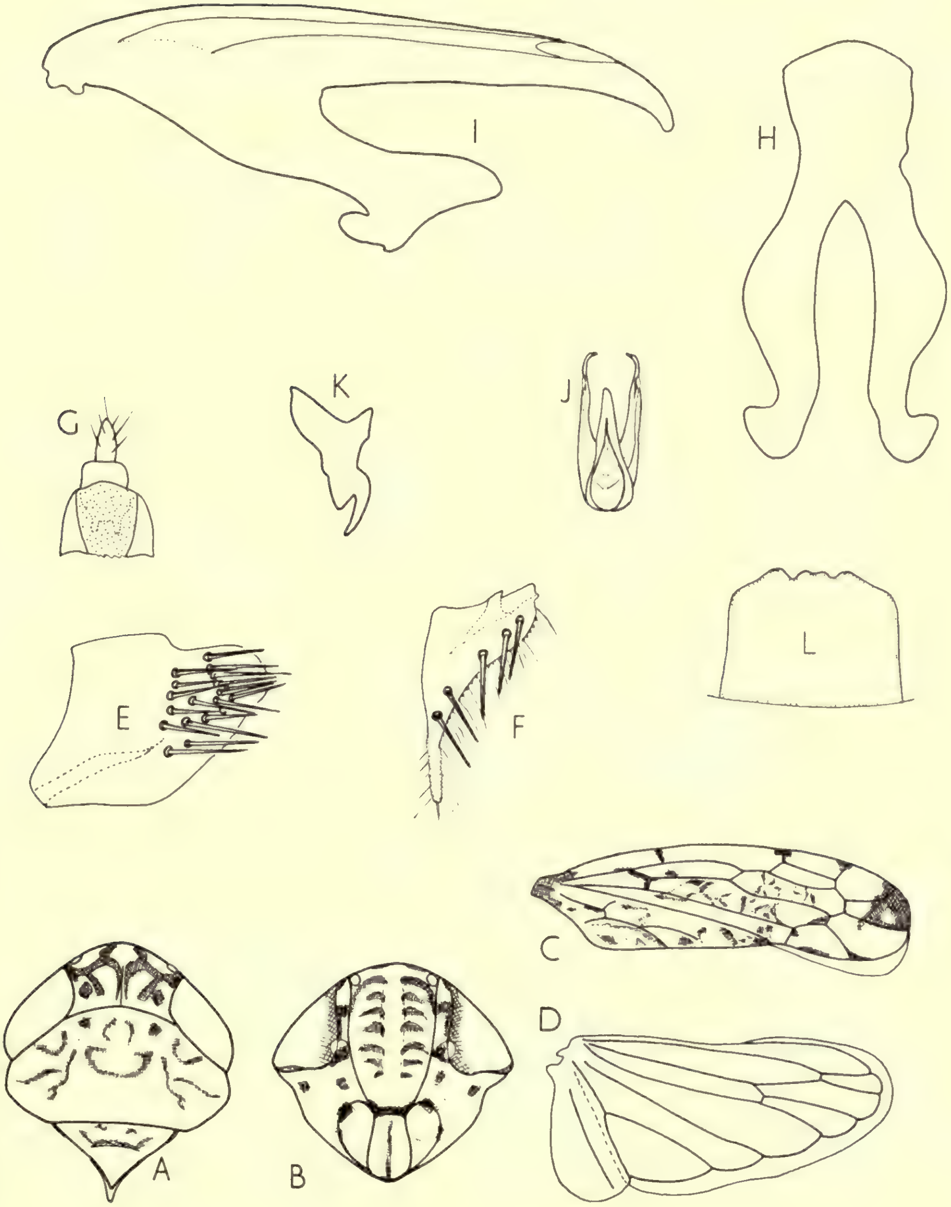
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Fig. 6. *Orosius argentatus* (Evans). ♂ and ♀; for explanation of figures, see p. 252.

Material examined. AUSTRALIA: Musgrave Ra (S.A.), 1 ♂, 2 ♀, vi.61 (*H. Cogger*); Broken Hill, N.S.W., 2 ♂, 2 ♀, iii.1924 (*F. W. Shepherd*), Australian Museum, Sydney; Burnley, Vic., on weeds, 1 ♂, 3 ♀, x.30 (*J. Evans*); Blundale, F. C. T., 1 ♂, 1 ♀, 7.i.30 (*J. Evans*); Lockyer, 1 ♂, 1 ♀, ex lucerne, 25.vii.39 (*D. O. A.*), B.M. (N.H.); Canberra, ♀, 11.vi.46 (*A. V. Hill*); Cronula, N. S. Wales, ♀, xii.1924 (*H. Petersen*), det. as *Nesaloha cantonis* Oman = *Th. argentatus* Evans ?, U.S. Nat. Mus. Washington.

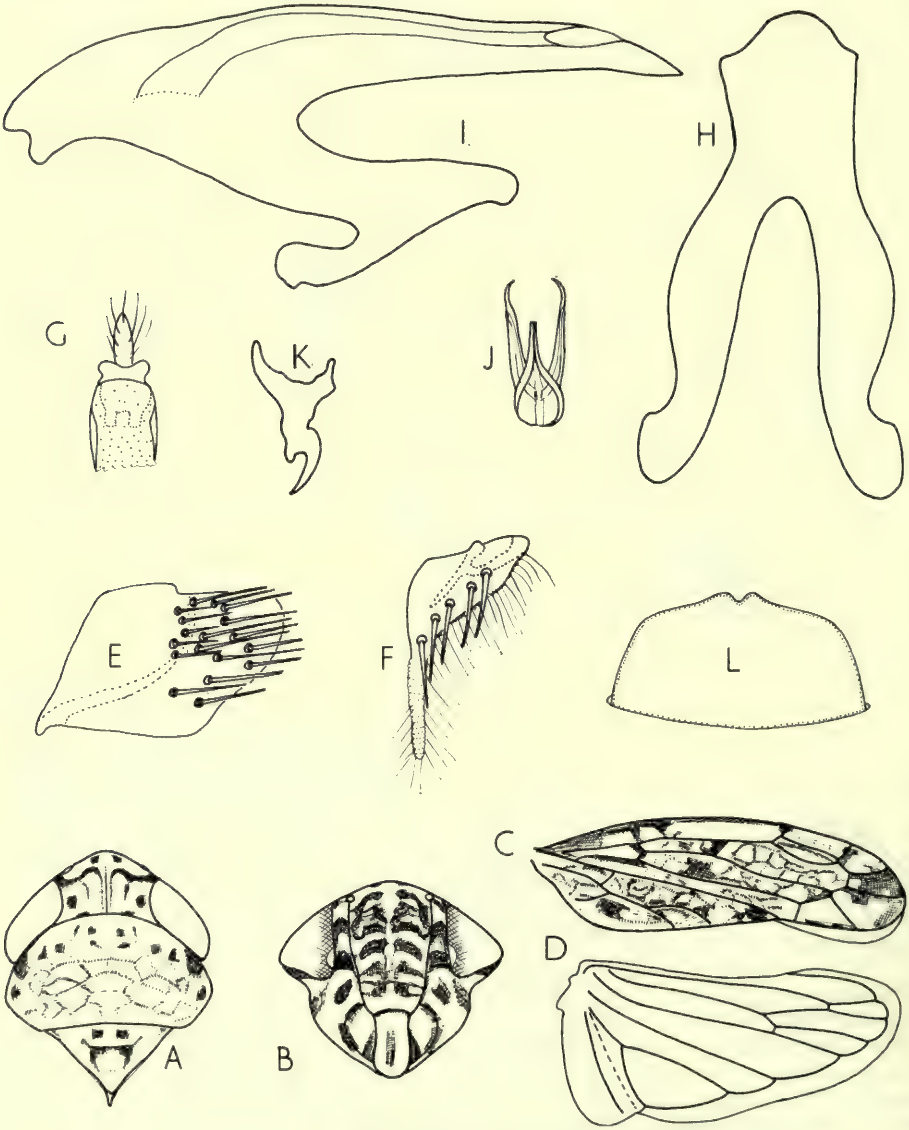

FIG. 7. *O. argentatus* (Evans) from Java. ♂ and ♀; for explanation of figures, see p. 252.

NORFOLK ISLAND : flying over large patch of *Ipomoea batatas* Lam., 1 ♂, 10.v.1939 (*I. McComish*), B.M. (N.H.).

FIJI : Viti Levu, Suva, 1 ♂, iii.1951 (*N. L. H. Krauss*), det. as *lotophagorum* Kirk. (= *argentatus* Ev.), Dr. R. Linnavuori Coll., Finland.

W. CAROLINE IS. : Paia I., 2 ♀, 28–29.iv.1954 (*J. W. Beardsley*), det. *Nesophrosyne* (*Orosius*) *argentatus* (Evans), Bishop Museum, Honolulu and Dr. R. Linnavuori Coll., Finland.

DANGER ISLAND : Motu Katava, 1 ♂, 1.iii.24 (*E. H. Bryan* Jr.), det. *Nesophrosyne argentatus* (Evans), Bishop Museum, Honolulu.

O. argentatus (Evans) has been confused with *O. lotophagorum* (Kirkaldy) in the past, but can be readily separated from the latter by its wider appendix and by the shape of its aedeagus, whose branches narrow gradually.

O. argentatus (Evans) from Java

(Text-fig. 7)

Coloration : very similar to *O. argentatus* from Australia, but with reddish markings on face, tegmen and legs.

Measurements in mm. of ♂ and (♀) *:* head, width across eyes 0·78–0·79 (0·86), width between eyes 0·31–0·32 (0·34), median length of vertex 0·24–0·27 (0·29), length of frons 0·49–0·51 (0·51–0·54), maximum width of frons 0·34 (0·37) ; width of pronotum 0·78–0·82 (0·88), median length of pronotum 0·41–0·43 (0·43–0·44), width at base of scutellum 0·41–0·47 (0·45), median length of scutellum 0·27–0·34 (0·34–0·42), length of tegmen 2·37 (2·53–2·58) ; body length 2·90 (3·16–3·21).

Specimens from Java are very similar to the nominate form from Australia, only differing in minor details—basal plate, with rectangularly narrow apex slightly more developed, aedeagus with lateral branches slightly diverging.

Material examined. WEST JAVA : Bogor, on *Arachis hypogea*, ♂, ♀, vii.1954 (*B. H. H. Bergman*), B.M. (N.H.).

Orosius argentatus novaebritanniae ssp. n.

(Text-fig. 8)

Coloration : very dark, darker than most of the specimens of the nominate form from Australia, black markings, especially on frons, much more extensive and deeper in shade.

Measurements in mm. of ♂ and (♀) *:* head, width across eyes 0·78 (0·81–0·84), width between eyes 0·29 (0·32–0·33), median length of vertex 0·24 (0·25–0·27), length of frons 0·47 (0·51), maximum width of frons 0·34 (0·34) ; width of pronotum 0·78 (0·81–0·82), median length of pronotum 0·41 (0·41), width at base of scutellum 0·54 (0·54), median length of scutellum 0·34 (0·37–0·41), length of tegmen 2·23 (2·23) ; body length, 2·76 (2·82–2·90).

Tegmen with wide appendix ; pygofers with comparatively fewer setae ; basal plate with slightly longer, rectangularly narrow apex and subparallel arms ; aedeagus with lateral branches slightly diverging, but otherwise similar to those of *O. argentatus* ; other parts of ♂ genitalia as figured.

Holotype ♂. NEW BRITAIN: Rabaul, Kerarat, 31.viii.1959, ex *Crotalaria goreensis* (*A. J. von Velsen*), B.M. (N.H.).

Paratypes: 2 ♀, with same data as holotype ♂.

Although the material examined is not adequate, the new subspecies can be distinguished from the nominate form by the shape of its basal plate, aedeagus and the colour of its body which is very dark.

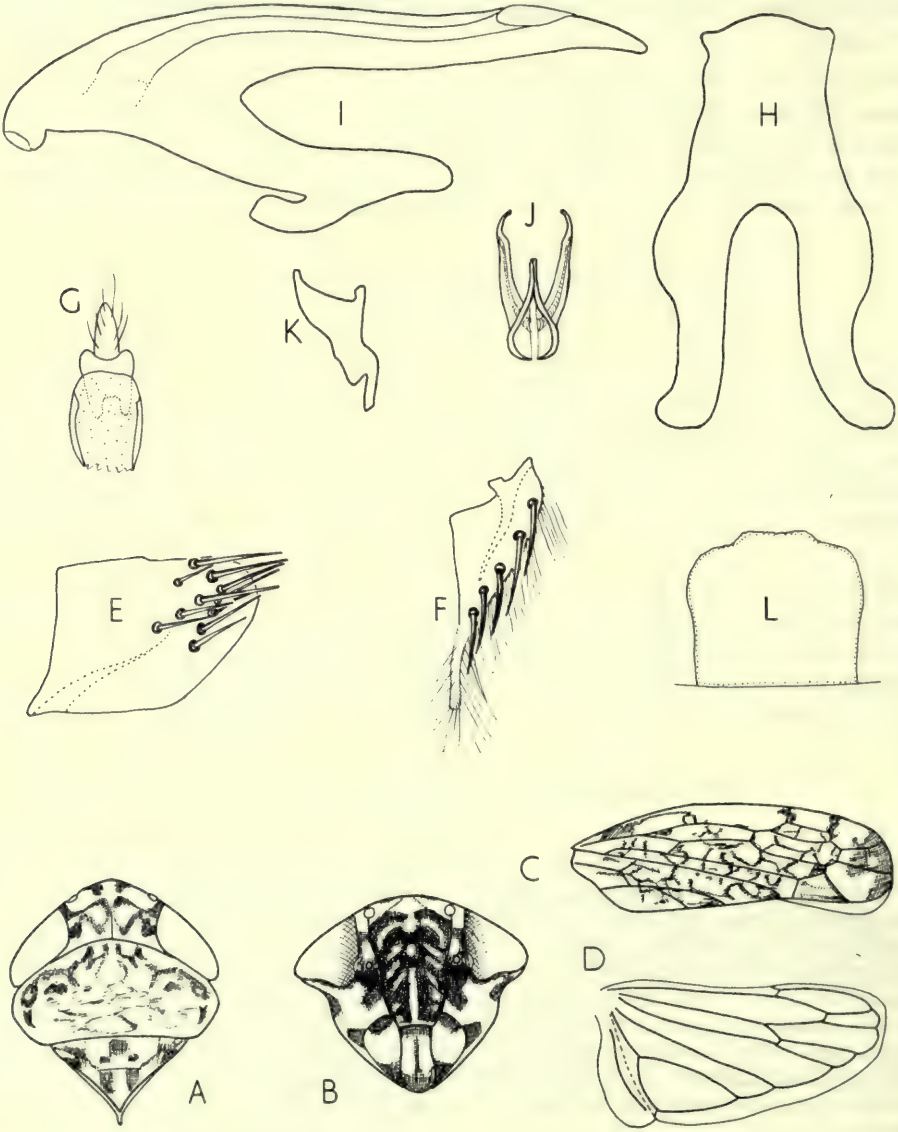

FIG. 8. *O. argentatus novaebritanniae* ssp. n. ♂ and ♀; for explanation of figures, see p. 252.

Orosius cantonis (Oman)

(Text-fig. 9)

Nesaloha cantonis Oman, 1943*b* : 33.
Orosius cantonensis (Oman) Linnavuori, 1960*a* : 56.

Coloration : general pattern of coloration similar to that of *O. albicinctus* Distant, but with fewer lighter markings.

Measurements in mm. of ♂ and (♀) *:* head, width across eyes 0·76–0·78 (0·84–0·86), width between eyes 0·32 (0·34–0·36), median length of vertex 0·20 (0·24), length of frons 0·44 (0·49–0·51), maximum width of frons 0·32–0·34 (0·36–0·37) ; width of pronotum 0·74 (0·79–0·81), median length of pronotum 0·37 (0·41), width at base of scutellum 0·44–0·47 (0·44–0·51), median length of scutellum 0·30 (0·28–0·34), length of tegmen 2·10 (2·10) ; body length 2·63 (2·63–2·74).

Small and delicate leaf-hoppers ; vertex rounded anteriorly, with anterior and posterior margins almost parallel, median length and length next to eye almost equal ; tegmen with wide appendix ; pygofers with numerous setae ; basal plate with apex squarish and anterior arms slightly diverging ; aedeagus with lateral branches slightly diverging, their apices curved inwards, in lateral view gradually narrowed and turned upwards like a " beak " ; other parts of ♂ genitalia as figured. ♀ VII sternum, hind margin truncate in middle, with broad emargination on lateral angles, as shown in Text-fig. 9, L.

Material examined. CANTON IS. : Ex *Boerhaavia diffusa* L., 2 ♂, 1 ♀ paratype, 1.viii.40 (*Van Zwaluwenberg*) ; ex *Boerhaavia tetranda* Forst., 1 ♀, 26.ix.1940 (*R. Damer*). ENIWETOK ATOLL : Eniwetok, *Portulaca quadrifida*, 2 ♂, 13.v.46 (*Townes* 61) ; Aomon, swept grass, 1 ♂, 16.v.46 (*Townes* 218) ; Eniwetok, Japtan, ex grass, 1 ♂, 17.v.46 (*Oakley* 112). FASSARI I. : Uliathiat, 1 ♂, 10.vii.46 (*H. K. Townes*, No. 1052). All material in U.S. National Museum, Washington, D.C.

Although the shape of the various parts of ♂ genitalia are broadly similar to those of *O. argentatus* (Evans), the small size of the body and the shape of its head with parallel margins of vertex separate *O. cantonis* (Oman) from all other species of the genus *Orosius*.

Recently Ishihara (1963 : 121–123) redescribed and figured *Eutettix orientalis* Matsumura (1914 : 192) as *Nesophrosyne orientalis* (Matsumura). From the figures it appears that the specimen belongs to *O. cantonis* (Oman). As the above-mentioned study by Ishihara is based on a Formosan material and not on the type or topotypic specimen, his conclusion cannot be accepted as final. As the type of *Eutettix orientalis* is not available at the moment, no further comments can be made.

Orosius canberrensis (Evans) **comb. n.**

(Text-fig. 10)

Thamnotettix canberrensis Evans, 1938*b* : 15.

Coloration : pale ochraceous, bright, almost immaculate ; eyes greyish ; ocelli bright red.

Measurements in mm. of ♂ and (♀) *:* head, width across eyes 0·88 (0·98–1·00), width of vertex between eyes 0·35 (0·42–0·44), median length of vertex 0·25 (0·27), length of frons 0·54 (0·63), maximum width of frons 0·37 (0·45–0·47) ; width of pronotum 0·88 (0·98–1·00), median length of pronotum 0·47 (0·47–0·49), width at base of scutellum 0·51 (0·54–0·57), median length of scutellum 0·37 (0·41), length of tegmen 2·71 (2·76) ; body length 3·29 (3·42–3·45).

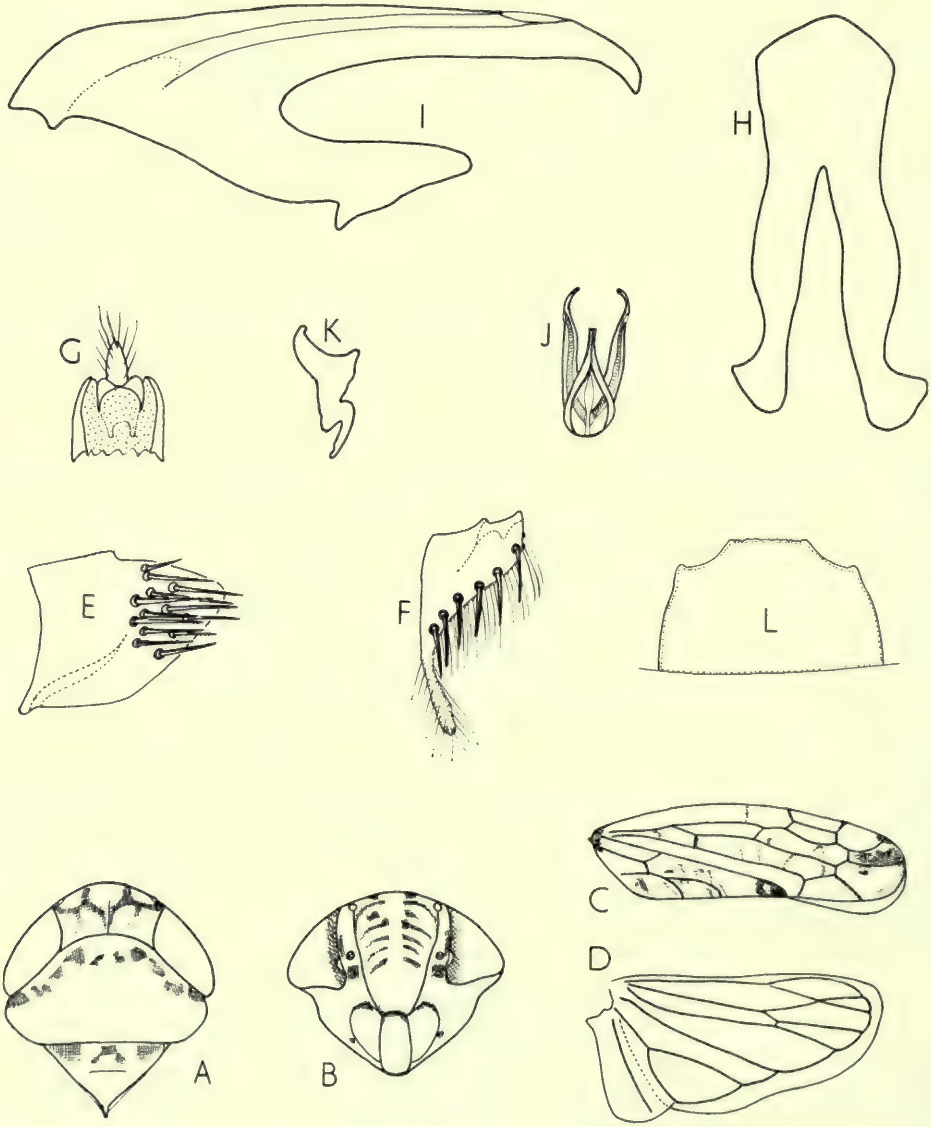
I
H
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Fig. 9. *Orosius cantonis* (Oman). Paratype ♂ and ♀; for explanation of figures, see p. 252.

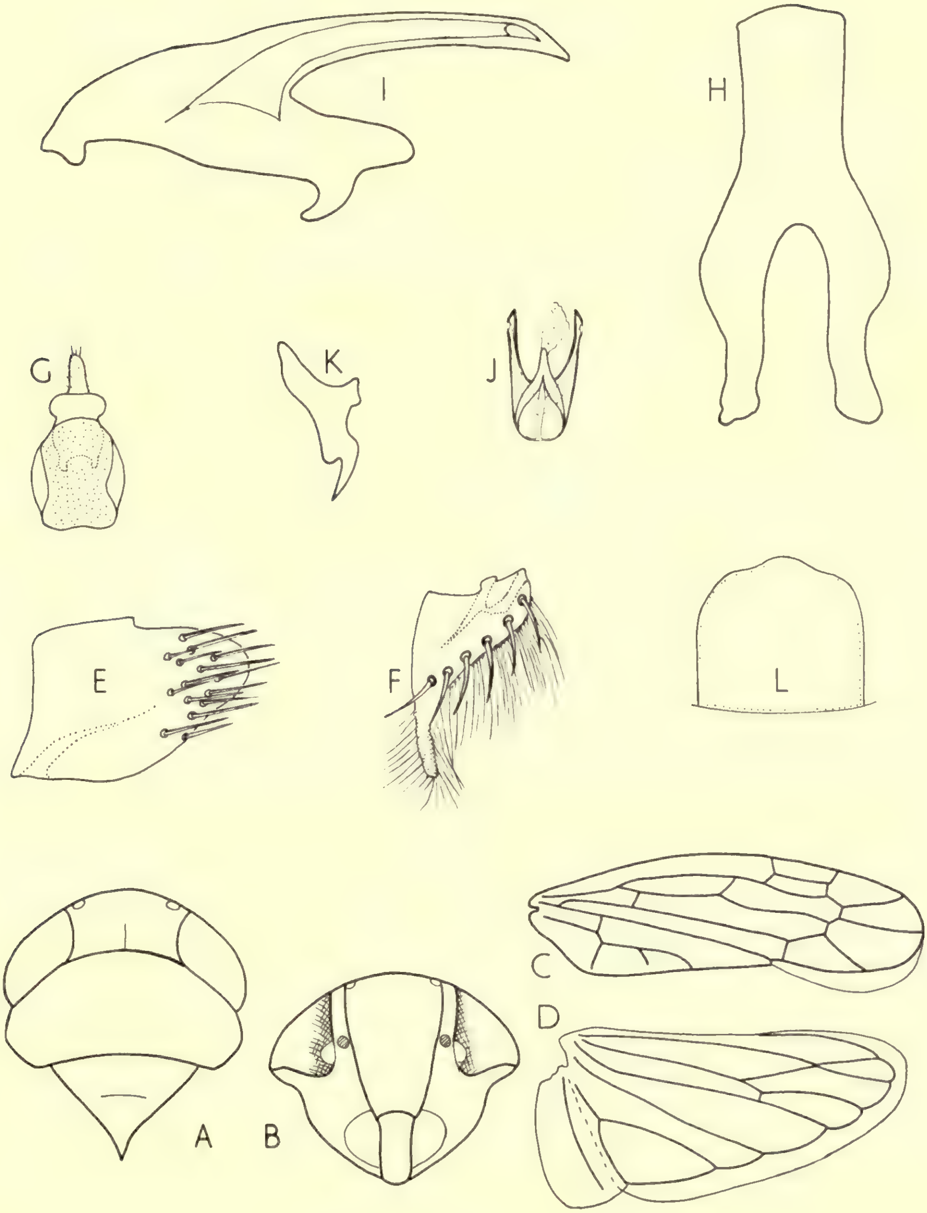
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FIG. 10. *Orosius canberrensis* (Evans). ♂ and ♀; for explanation of figures, see p. 252.

Orosius canberrensis (Evans) is the largest species of the genus *Orosius*, with robust body, very wide head and the vertex with anterior and posterior margins almost parallel; pronotum short; pygofers with numerous setae; basal plate with rectangularly narrow and long apex and parallel anterior arms; aedeagus with lateral branches comparatively short and widely parallel, without their apices much produced beyond gonopore as seen in lateral view; other parts of ♂ genitalia as figured. ♀ VII sternum, hind margin bulging slightly in middle.

Material examined. AUSTRALIA: Canberra, F.C.T., 1 ♀ paratype, 1 ♂, Mar., 1930 (*J. Evans*), B.M. (N.H.); Broken Hill, N.S.W., 1 ♀, iii.1924 (*F. W. Shepherd*), Australian Museum, Sydney.

The large size, immaculate coloration, parallel-sided vertex, very long apex of basal plate and the short lateral branches of its aedeagus readily separate *O. canberrensis* (Evans) from other species of *Orosius*.

***Orosius aegypticus* sp. n.**

(Text-fig. 11)

Coloration: general body colour similar to that of *O. albicinctus* Dist.; vertex and pronotum with fewer dark markings, frons and other parts of face with scanty light brown markings, ocelli reddish yellow; ovipositor reddish.

Measurements in mm. of ♂ and (♀): head, width across eyes 0·88 (0·91), width between eyes 0·37 (0·35), median length of vertex 0·32 (0·34), length of frons 0·61 (0·62), maximum width of frons 0·37; width of pronotum 0·91 (0·95), median length of pronotum 0·42 (0·42), width at base of scutellum 0·53 (0·54), median length of scutellum 0·37 (0·40), length of tegmen 2·55 (2·63); body length 3·10 (3·21).

Vertex somewhat flat, wider and longer than most other species; tegmen with wide appendix; pygofers with fewer setae. Basal plate very small compared to other species of *Orosius*, stem reduced, giving it the shape of a " U " rather than that of a " Y "; aedeagus with parallel branches in lateral view showing their sudden narrowing from the globular base; other parts of the ♂ genitalia as figured; ♀ VII sternum with a shallow, wide emargination on the hind margin.

Holotype ♂. EGYPT: Siwa, 12.v.1935, (*J. Omer-Cooper*), Armstrong College Expedition B.M. 1935–354, in B.M. (N.H.). Holotype ♂ bearing a determination label *Orosius cellulosus* Ldbg. by W. Wagner, 1955.

Paratypes. Several ♀, same data as holotype.

This species is characterised by its flat vertex, smaller basal plate, form of aedeagus and style, by which it differs from all other species of *Orosius*.

The status of the new species should be considered, however, as tentative. Since only a single ♂ was available, the shape of the genitalia and that of the vertex could not be confirmed by reference to a second ♂. The holotype ♂ might be a diseased specimen although no signs were found to suggest this.

KEY TO THE SPECIES OF *OROSIUS*

1 Anterior and posterior margins of vertex parallel 2
– Anterior and posterior margins of vertex not parallel 3
2 Body immaculate . . . . **canberrensis** (Evans) (p. 247)

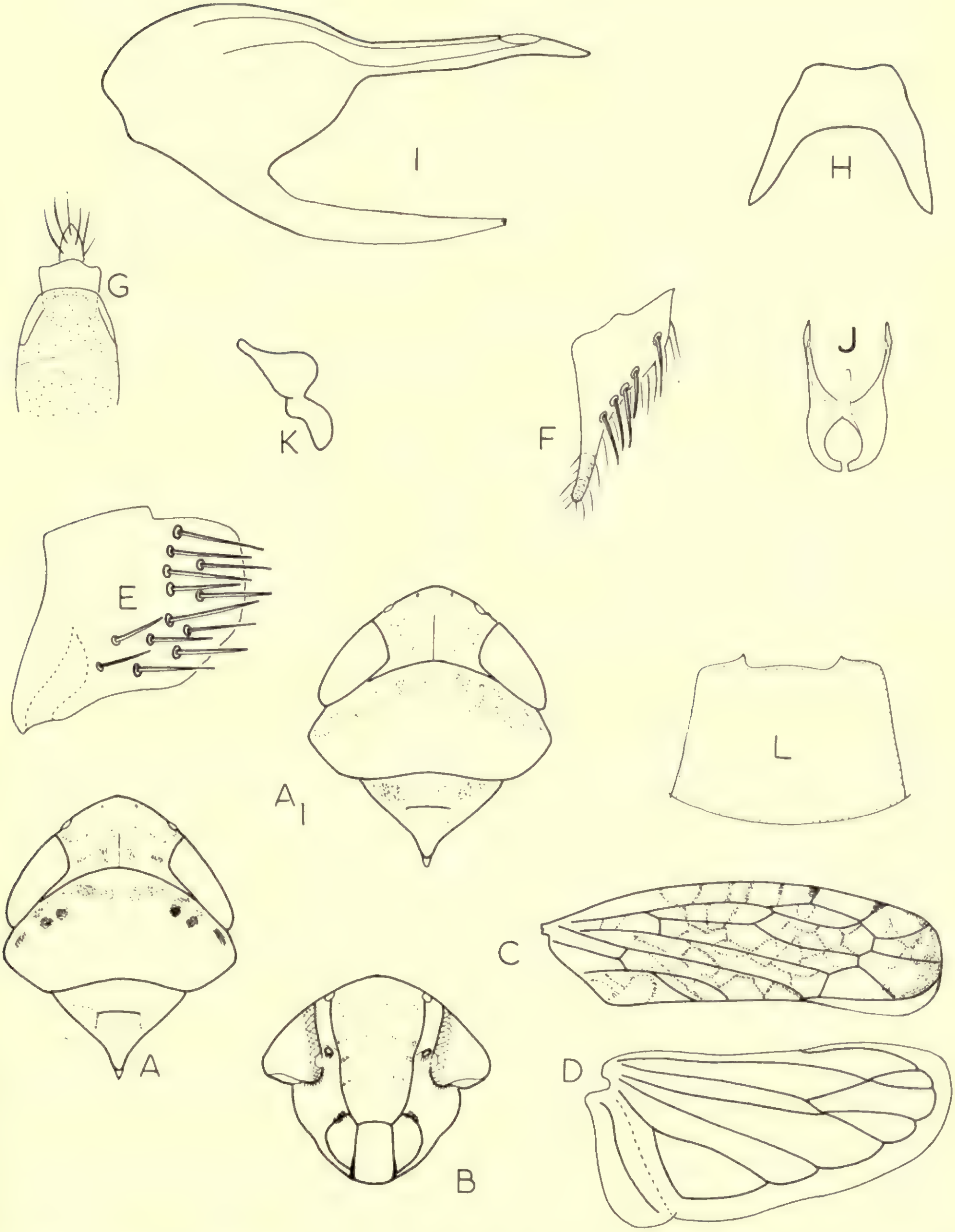

FIG. 11. *Orosius aegypticus* sp. n. Holotype ♂ and paratype ♀; A_1 and L belong to female, the others to holotype male; for explanation of figures, see p. 252.

– Body with dark markings . . . . **cantonis** (Oman) (p. 247)

3 Body robust, appendix of tegmen narrow, apex of aedeagus beyond gonopore abruptly produced as a narrow process . . **lotophagorum** (Kirkaldy) (p. 241)

– Body of moderate size, appendix of tegmen broad, apex of aedeagus variously narrowed, but never abruptly so 4

4 Body of basal plate reduced to a transverse " bar ", (stem of " Y " absent) **aegypticus** sp. n. (p. 250)

– Body of basal plate developed (stem of " Y " triangular or rectangular) . . 5

5 Body of basal plate triangular, branches of aedeagus widely divergent **albicinctus** Distant (p. 236)

– Body of basal plate rectangular, branches of aedeagus parallel or sub-parallel . 6

6 Shaft of aedeagus sinuate. . . . . . . **cellulosa** (Lindberg) (p. 239)

– Shaft of aedeagus not sinuate 7

7 Brown markings on body not extensive, normal, like most of the other species of *Orosius* . . . . **argentatus** (Evans) (p. 242)

– Brown markings very extensive, body dark brown **argentatus novaebritanniae** ssp. n. (p. 245)

LETTERING USED IN TEXT-FIGURES

A and A_1	dorsal view of head and thorax	G	dorsal view of anal tube
B and B_1	ventral view of head and thorax	H	dorsal view of basal plate
C and C_1	tegmen	I	lateral view of aedeagus
D and D_1	wing	J	dorsal view of aedeagus
E	lateral view of pygofers	K	dorsal view of style
F	ventral view of subgenital plate	L	ventral view of ♀ VII sternum

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A REVISION OF THE GENUS *ANTHENE* FROM THE ORIENTAL REGION (LEPIDOPTERA : LYCAENIDAE)

G. E. TITE

BULLETIN OF
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20 SEP 1966
NATURAL HISTORY

A REVISION OF THE GENUS *ANTHENE* FROM THE ORIENTAL REGION (LEPIDOPTERA : LYCAENIDAE)

BY

G. E. TITE

British Museum (Natural History)

Pp. 253–275 ; 2 *Plates* ; 28 *Text-figures*

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ENTOMOLOGY Vol. 18 No. 8

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TRUSTEES OF
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Issued 21 *September* 1966 *Price Twelve Shillings*

A REVISION OF THE GENUS *ANTHENE* FROM THE ORIENTAL REGION (LEPIDOPTERA : LYCAENIDAE)

By G. E. TITE

CONTENTS

	Page
Introduction	255
Anthene Doubleday	256
Pseudodipsas Felder	272
References	272
Index	274

SYNOPSIS

As a result of the study of the male genitalia the grouping of the species and subspecies in the genus is revised. Seven new taxa are described, and the species described as *Lycaenesthes rufimargo* Rothschild is removed to the genus *Pseudodipsas*.

INTRODUCTION

The rearrangement of the material in the British Museum (Natural History) has elicited the fact that Fruhstorfer's interpretation (1916 and 1923) of the relationships of the species and races contained in the genus *Anthene*, then known as *Lycaenesthes*, is much in need of revision. That author divided the genus into only two species which he gave as (a) *Lycaenesthes emolus* and (b) *Lycaenesthes lycaenina* ; rather inconsistently he went on to say that *Lycaenesthes philo* must be separated from (a) on genitalic grounds. In the main, his species (a) and (b) do correspond with (a) and (b) below, but his placing of *lycaenoides* as a subspecies of *emolus* is quite wrong. Corbet & Pendlebury (1956) in dealing with the Malayan species did make some modifications, but a more general survey dealing with the named forms from the whole of the oriental region is now desirable. Toxopeus visited Tring Museum in the 1930s, and evidently intended to publish a revision of the genus ; he selected types, placing name labels on the specimens ; unfortunately the intended work never materialized. In the present survey, these names have been adopted where deemed necessary ; they are indicated by the words " Toxopeus MS. " in acknowledgement of their originator, and unless otherwise stated, the actual specimens selected by Toxopeus are designated as types.

All the forms here dealt with are very similar in outward structure and appearance. Study of the ♂ genitalia does however reveal that there are two main groups : (a) the *emolus* Godart group, which includes *seltuttus* Röber, *paraffinis* Fruhstorfer, and *philo* Hopffer ; and (b) the *lycaenoides* Felder group, which includes *licates* Hewitson, *villosa* Snellen, and *lycaenina* Felder.

Many subspecific names founded on inconstant or doubtful characters are to be found in the literature. In this work an attempt is made to assign such names to their correct species, although the inclusion of a name does not necessarily imply agreement that it does in fact represent a well differentiated subspecies. It should be noted that the localities given in the text are those represented in the B.M. (N.H.) collection ; they do not in every case portray the full extent of the area inhabited by the species or subspecies concerned. The word (Type !) after a reference indicates that the type is in the B.M. (N.H.), and that it has been examined.

ACKNOWLEDGEMENTS

The author wishes to express his thanks and appreciation to Sir Keith Cantlie, C.I.E. for his kindly aid in elucidating the status of *lycaenoides* and *lycaenina*.

ANTHENE Doubleday, 1847

Type-species : *Papilio larydas* Cramer, 1780.

Anthene Doubleday, 1847 : 27.
Lycaenesthes Moore, 1865 : 773.
Lycaenesthes Moore ; Bethune-Baker, 1910 : 14.
Lycaenesthes Moore ; Fruhstorfer, 1916 : 96.
Lycaenesthes Moore ; Fruhstorfer, 1923 : 896.
Lycaenesthes Moore ; Aurivillius, 1924 : 435.
Anthene Doubleday ; Hemming, 1935 : 435 [designation of type].

Diagnoses of the genus have been given by Bethune-Baker, Fruhstorfer and Aurivillius (as *Lycaenesthes*) and by Corbet as *Anthene*.

KEY TO SPECIES

1 Underside fore wing, the median band is unbroken. ♀ forewing with a large white area in the disc on both surfaces . . . . **lycaenoides** (p. 270)
– Underside forewing, the median band is broken at either vein 2, 3, or 4. ♀ fore wing never with a clear white area on both surfaces 2
2 Underside fore wing, the median band is broken at vein 3 3
– Underside fore wing, the median band is broken at vein 2, or at 2 and 3 . . 5
3 Underside fore wing without markings inwards of or below the discoidal spot . . **lycaenina** (p. 269)
– Underside fore wing with irregular white markings inwards of or below the discoidal spot 4
4 Underside fore wing, the white markings inwards of the discoidal spot take the form of a short stripe in the middle of the cell, and a long excurved stripe below it in area 1 . . . . **licates** (p. 270)
– Underside fore wing, the white markings below the discoidal spot take the form of a line starting at the lower portion of the discoidal spot, and proceeding towards the hind margin and the base in a wide curve; in some examples, this line is still further extended to form a complete circle . . . . **villosa** (p. 271)
5 Underside fore wing with transverse band very irregular in areas 3, 4, 5 and 6. Fringes all wings above, whitish 6

– Underside fore wing with transverse band fairly regular in areas 3, 4, 5 and 6. Fringes all wings pale fuscous 7
6 Upperside all wings, intense shining violaceous. Underside, all markings large and well defined . . . . **philo** (p. 266)
– Upperside all wings, dull violaceous. Underside pale, all markings weakly defined **lycaenolus** (p. 267)
7 Underside hind wing, the median band of spots is evenly curved, and scarcely nearer the margin in areas 4 and 5 than it is in area 2 . . . . . **emolus** (p. 257)
– Underside hind wing, the median band of spots bulges outward so that it is considerably nearer the margin in areas 4 and 5 than it is in area 2 8
8 Upperside all wings with a black marginal band of up to 1 mm. in width. Hind wing, with a submarginal series of internervular spots . . . . **seltuttus** (p. 259)
– Upperside all wings with a scarcely perceptible hair-like black marginal band. Hind wing, with submarginal spots in areas 2 and 3 only . . . . **paraffinis** (p. 263)

Anthene emolus (Godart)

The oldest name for this species would seem to be *Lampides balliston* Hübner (1823 : 11). Previously, authors have given the date 1819 or 1823 as the date of publication for *emolus* Godart, but according to Sherborn and Woodward (1899 : 595), (1906 : 578) the correct date is 1824 ; thus *emolus* is the junior name. As the name *balliston* has not been used as a primary synonym for more than 50 years, and as the species under consideration has for that period been known to entomologists as *emolus* Godart, it would appear that this is a case for application to the International Commission on Zoological Nomenclature—under Article 23 (B) (i) of the I.C.Z.N.—for the suppression of the name *balliston* Hübner as a *nomen oblitum*. This action is being taken, and it is hoped that the synonomy used in this paper will be confirmed in due course.

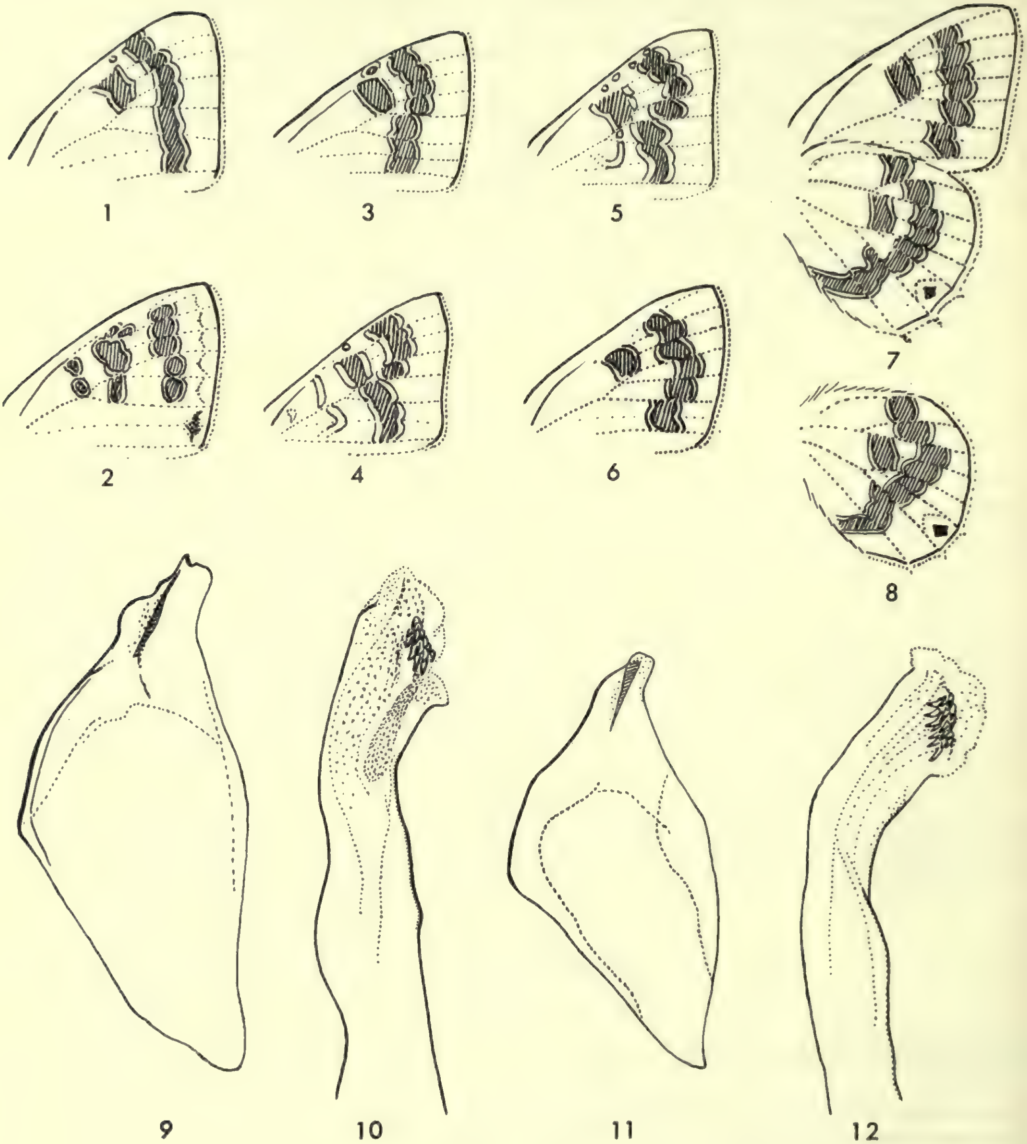
Subspecific names have been given as shown below ; they do not always represent very distinct races, and so are listed without comment. Continental dry season forms are considerably paler in colour on both surfaces.

(1) ***A. emolus emolus*** (Godart)

(Textfigs. 7, 21 and 22)

Lampides balliston Hübner, 1823 : 11, figs. 229–230, " aus Georgien in Florida ", [nomen oblitum].
Polyommatus emolus Godart, 1824 : 656, Bengal.
Lycaenesthes bengalensis Moore, 1865 : 773, pl. 41, fig. 9.
Lycaenesthes balliston (Hübner) Semper, 1879 : 165.
Plebeius balliston (Hübner) Kheil, 1884 : 28.
Nacaduba klanga Corbet, 1938 : 143.
Anthene emolus (Godart) Corbet, 1956 : 457.

In B.M. (N.H.) from South India, NW. India, Bhutan, Sikkim, Assam, Burma, and Tenasserim.



Figs. 1–12. 1–6. ♂ underside fore wing (diagrammatic) : 1. *Anthene lycaenoides* ; 2. *Pseudodipsas rufimargo* ; 3. *Anthene lycaenina* ; 4. *A. licates* ; 5. *A. villosa* ; 6. *A. philo*. 7. ♂ fore and hind wing, *A. emolus*. 8. ♂ hind wing, *A. seltuttus*. 9 and 11. clasper: 9. *Pseudodipsas rufimargo* ; 11. *P. digglesii*. 10 and 12. aedeagus : 10. *P. rufimargo* ; 12. *P. digglesii*.

(2) *A. emolus andamanicus* (Fruhstorfer)

Lycaenesthes emolus andamanicus Fruhstorfer, 1916 : 97, Andamans.
Anthene emolus andamanicus (Fruhstorfer) Cantlie, 1963 : 67.

In B.M. (N.H.) from Andamans.

(3) *A. emolus goberus* (Fruhstorfer)

Lycaenesthes emolus goberus Fruhstorfer, 1916 : 97, North Borneo.
Anthene emolus goberus (Fruhstorfer) Corbet, 1956 : 291.

In B.M. (N.H.) from Siam, Malaya, Sumatra, Borneo, and Hainan.

(4) *A. emolus modesta* (Staudinger) **comb. n.**

Pseudodipsas modesta Staudinger, 1889 : 104, Palawan.

In B.M. (N.H.) 2 ♂, 1 ♀, Palawan.

(5) *A. emolus minor* (v. Eecke) **comb. n.**

Lycaenesthes emolus minor v. Eecke, 1918 : 94, Pulo Babi.

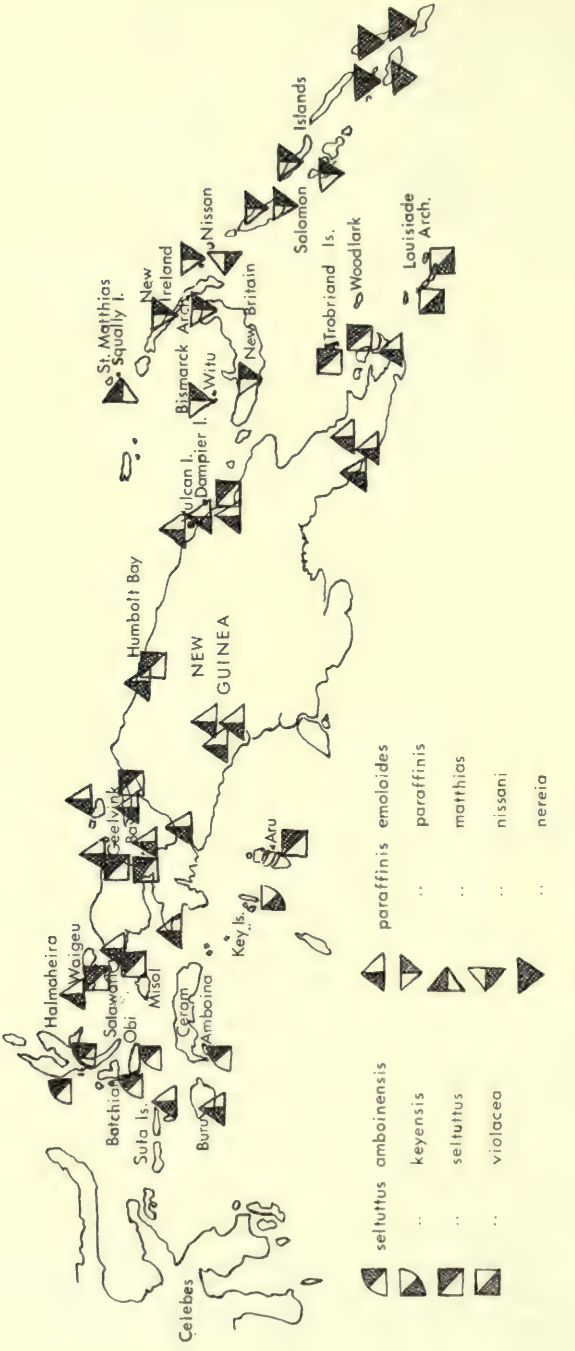
(6) *A. emolus javanus* (Fruhstorfer) **comb. n.**

Lycaenesthes emolus javanus Fruhstorfer, 1916 : 97, E. Java.

In B.M. (N.H.) from Java and Sumbawa.

Anthene seltuttus (Röber)

The races grouped here under *seltuttus* and *paraffinis* have long been treated as conspecific with *emolus*. Examination of the male genitalia shows that while *seltuttus* and *paraffinis* are indistinguishable, *emolus* differs in the size and shape of the clasper, rendering its specific separation necessary. According to the data labels on the material examined, both the other species occur together in certain localities, yet over parts of the range, each occurs as a well differentiated geographic entity. They can be distinguished in the male by the presence on the upperside of *seltuttus* of a dusky wide margin of up to 1 mm. on all wings, and of a usually complete series of black submarginal spots on the hind wing ; in *paraffinis*, on the upperside by the brighter violaceous ground colour, the hair-like appearance of the wing margins, and by the presence on the hind wings of only two black submarginal spots situated in areas 2 and 3. The undersides of the two species in both sexes are very similar, but careful comparison reveals the following points : *seltuttus*, on the fore wing the spots forming the median band tend to coalesce, those in areas 5–6 though irregularly placed form a fairly straight line, the hachures enclosing the submarginal spots are sharply acute, especially those on the hind wing ; *paraffinis* : the spots of the fore wing median band are smaller, rounder, and those in areas 3–7 form a rough arc, the submarginal hachures tend to be less acute, those on the fore wing often being almost straight.


Celebes
Suta Is.
Batchian
Buru
Halmaheira
Obi
Salawatti
Waigeu
Misol
Ceram
Amboina
Key Is.
Aru
Geelvink Bay
NEW GUINEA
Humbolt Bay
Vulcan I.
Dampier I.
St. Matthias
Squally I.
Bismarck Arch.
Witu
New Ireland
New Britain
Nissan
Trobriand Is.
Woodlark
Louisiade Arch.
Solomon Islands
seltuttus amboinensis
keyensis
seltuttus
violacea
paraffinis emoloides
paraffinis
matthias
nissani
nereia

The distribution of *Anthene seltuttus* and *A. paraffinis* in the Papuan Region as instanced by the material in the B.M. (N.H.).

(1) ***A. seltuttus amboinensis*** (Butler) **comb. n.**

Lycaenesthes amboinensis Butler, 1899 : 343, Amboina. (Type !).

The material listed below is insufficient to provide a sure guide to the subspeciation obtaining in the Moluccas. As far as can be judged, the males from Halmaheira and Obi do not differ from Butler's type from Amboina. The female that that author described and compared with *L. turneri* (= *lycaenoides godeffroyi* Semper) is almost certainly an example of *A. lycaenoides lycaenoides* (Felder), as he states that it was in the Hewitson collection, and the only specimen from that collection in the B.M. is certainly of that species. The solitary *amboinensis* ♀ in the B.M. is from the island of Obi ; it is described below, but in view of the fact that it is not known whether it is identical with females from Amboina, it is not proposed to select this insect as the neallotype.

Fore wing upperside, fuscous with a large but ill defined patch of lavender, which covers the basal two-thirds of area 1, the basal halves of areas 2 and 3, and extends into areas 4 and 5, and the cell in the neighbourhood of the discoidal.

Hind wing upperside, fuscous with a sparse scattering of lavender scales, a series of six interneural black submarginal spots, each spot being encircled by an obscure lighter ring and bounded outwardly by a white stripe.

The underside is similar to that of the ♂ ; it is not more varied with white as stated by Butler.

A ♀ from Batchian is larger and darker, the lavender patch on the fore wing being represented only by a very few scattered lavender scales disposed mainly in area 1. More material is needed in order to ascertain if the Batchian examples represent a new subspecies.

In B.M. (N.H.) from MOLUCCAS : Amboina, 1 ♂, 1910 (*Rey*) ; Amboina, 1 ♂ (holotype) (Coll. Walker) ; Halmaheira, 8 ♂ ; Obi, 11 ♂, 1 ♀ ; Ternate, 1 ♂ (*Doherty*) ; Batchian, 2 ♀, 1 ♀.

(2) ***A. seltuttus keyensis*** **ssp. n.**

Lycaenesthes emolus keyensis Toxopeus MS.

This subspecies is very similar to *s. amboinensis*, only differing from it as follows : upperside ♂, the dusky marginal line is distinctly narrower ; upperside ♀, the lavender scaling is much less intense, appearing as a pale cloud on the dusky ground of the forewing ; underside ♂♀, the ground colour is distinctly paler than that of either *amboinensis* or *seltuttus*.

As Toxopeus selected an abnormal specimen as holotype, an example that serves better to characterize the race has been designated below.

Holotype ♂. KEY ISLANDS : Little Key, 19.iii.1897 (*H. Kuhn*), B.M. Type No. Rh. 18345.

Allotype ♀. As holotype, 21.ii.1897, B.M. Type No. Rh. 18346.

Other examples in B.M., KEY ISLANDS : Little Key, 10 ♂, 1 ♀ ; Kissoei, Watoebela, 1 ♂ (*Kuhn*).

(3) *A. seltuttus seltuttus* (Röber) **comb. n.**

(Pl. 1, fig. 37; Pl. 2, fig. 49. Text-figs. 8, 25, and 26)

Plebeius seltuttus Röber, 1886 : 67, Pl. 5, fig. 24, Aru.
Lycaenesthes aruana Butler, 1899 : 344, Aru.

The ♂ is not to be distinguished in any way from that sex of *s. amboinensis*.

Röber figures and describes the ♀ as having a white patch on the fore wing. Butler also describes the white patch, and mentions two such examples in the B.M. These white-patched insects are still in the collection together with six other females from Aru which exhibit no indication of a white patch; this suggests that in the majority of females the fore wing is completely fuscous, as are all *seltuttus* females from New Guinea.

In B.M. (N.H.) from ARU: 21 ♂, 8 ♀, various collectors. NEW GUINEA: Waigeu, 1 ♂ (*Waterstradt*); Salwatti, 1 ♂ (*Wallace*); Kapaur, 3 ♂, 2 ♀ (*Doherty*); I. of Amberfron, 1 ♂, 1909 (*C. & F. Pratt*); Ansus, Jobi, 1 ♀, 1892 (*Doherty*); Dorei Bay, 1 ♀, 1909 (*C. & F. Pratt*); Humbolt Bay, 2 ♂, 1 ♀ (Swinhoe Coll.); Humbolt Bay, 2 ♂, 6 ♀, 1892 (*Doherty*); Astrolabe Bay, 7 ♂, 2 ♀ (*C. Wahnes*); Stephansort, 1 ♂; Berlinhafen, 1 ♂ (*Fruhstorfer*); Woodlark I., 1 ♂, 4 ♀, iv.1897 (*A. S. Meek*); Fergusson I., 7 ♂, 3 ♀, 1894–5 (*Meek*); Kiriwini, Trobriand Is., 10 ♂, 5 ♀, 1895 (*Meek*).

(4) *A. seltuttus violacea* (Butler) **comb. n.**

Lycaenesthes violacea Butler, 1899 : 343, St. Aignan.

Slightly smaller, but very similar to the nominate subspecies, only differing as follows.

Upperside ♂. The colour is clearer less dingy violaceous, and the blackish submarginal spots on the hind wing, and the margins of all wings are more definitely defined and neater in appearance.

Upperside ♀. A very slight greyish lightening is present on the disc of the fore wing.

Underside ♂♀. Very like that of the nominate race.

In B.M. (N.H.) from LOUISIADES: St. Aignan, 3 ♂ (including type), 3 ♀; Rossell Island, 2 ♂, 2 ♀; Sudest Island, 6 ♂, 1 ♀ (all collected by *A. S. Meek*).

(5) *A. seltuttus affinis* (Waterhouse & Turner) **comb. n.**

Lycaenesthes modestus Waterhouse, 1903 : 198 [nec *modesta* Staudinger].
Lycaenesthes emolus affinis Waterhouse & Turner, 1905 : 801.

Differs from all other subspecies by the almost lilac violaceous colour of the male above, and by the pale grey-fawn ground of the underside in both sexes.

In B.M. (N.H.) from AUSTRALIA: Port Darwin; Cape York; Thursday I.; Groote Eylandt, Northern Territory; Kuranda; Cooktown; Cedar Bay; Bowen; Mackay.

Anthene paraffinis (Fruhstorfer)

(1) ***A. paraffinis emoloides* ssp. n.**

(Pl. 1, figs. 35–36; Pl. 2, figs. 47–48)

Lycaenesthes emoloides emoloides Toxopeus MS.

♂. The upperside on all wings is deep violaceous, and the dark margins are extremely fine. Dusky submarginal spots, each edged distally by a whitish line, are present in areas 1 and 2 of the hind wings.

♀. The upperside on all wings is dingy fuscous, having on the fore wing a diffusely margined whitish grey-blue area of individually variable extent. This area usually covers the basal half of areas 1 and 2, sometimes extending into the lower part of the cell and the adjoining parts of areas 3 and 4. On the hind wing, there is a series of dusky triangular submarginal spots, each spot margined outwardly with a whitish stripe.

Holotype ♂. BRITISH NEW GUINEA: Hydrographer Mountains, 2500 ft., i.1918 (*Eichhorn Bros.*), B.M. Type No. Rh. 18347.

Allotype ♀. As holotype, i–ii.1918, B.M. Type No. Rh. 18348.

Other examples in B.M. (N.H.). BRITISH NEW GUINEA: as holotype, 12 ♂, i–ii.1918; Kumusi R., 5 ♂, 1907 (*A. S. Meek*); Aroa R., 4 ♂ (*Meek*); Welsh R., 2 ♂ (*Weiske*); Milne Bay, 2 ♂, 1 ♀, 1899 (*Meek*); Port Moresby, 2 ♂; St. Joseph R., 1 ♂ (*Weiske*); Astrolabe Range, 2 ♂, 2 ♀, 1917 (*Dodd*); Haidana, Collingwood Bay, 1 ♀, iv.1907 (*Meek*); Yule I., 1 ♂, 1875 (*L. M. d'Albertis*). MANDATED NEW GUINEA: Stephansort, 1 ♂, 27.x.1894 (*Dr. Hagen*); Dampier I., 7 ♂, 1 ♀, ii–iii.1914 (*Meek*); Vulcan I., 7 ♂, 4 ♀, 1913–4 (*Meek*). DUTCH NEW GUINEA: Nr. Oetakwa R., Snow Mts., 3 ♂, 1910 (*Meek*); Base Camp, Utakwa R., Sea Level, 3 ♂, 1912–3 (*A. F. R. Wollaston*); Upper Setekwa R., Snow Mts., 2–3000 ft., 4 ♂, 1910 (*Meek*); Eilanden R., 2 ♂, xii.1910 (*Meek*); Mt. Goliath, 1 ♀, iii.1911 (*Meek*); Sabron, Cyclops Mts., 2 ♂, v.1936 (*L. E. Cheesman*); Njau Limon, S. of Mt. Bougainville, 300 ft., 1 ♂, 1936 (*Cheesman*); Sorong, 2 ♂, 1876 (*A. J. Bruijn*); Humbolt Bay Area (variously labelled) 4 ♂, 1 ♀: Kapaur, 6 ♂, 1 ♀ (*Doherty*); Jobi I., 5 ♂, 8 ♀ (*Doherty*); Mefor I., 1 ♂, 1 ♀ (*Doherty*); Roon I., 5 ♂, 1 ♀ (*Pratt*); Roon I., 1 ♂ (*Doherty*); Amberfron I., 2 ♂, 1 ♀ (*Pratt*); Biak, Schouten Is., 2 ♀ (*Pratt*); Wandesi, 8 ♂ (*Doherty*); Wangaar R., 15 miles from the Coast, 600 ft., 1 ♂, 1921 (*Pratt*); Waigeu, 11 ♂, 5 ♀; Salwatti, 2 ♂. MOLUCCAS: Misol, 5 ♂, 1 ♀; Buru, 1 ♂, 3 ♀; Sula Is., 2 ♀.

(2) A. ***paraffinis paraffinis*** (Fruhstorfer) **comb. n.**

(Text-figs. 27–28)

Lycaenesthes emolus paraffinis Fruhstorfer, 1916: 99, Neu Lauenberg (Duke of York I.).

The ♂ is not to be distinguished from that of *p. emoloides*, but the absence of the whitish grey-blue patch on the fore wing of the ♀ renders the separation of the two races necessary. The ♀ occurs in two forms.

(a) All wings are fuscous brown above. There is on the hind wing a series of 5 triangular submarginal black spots, each edged inwardly by a white hachure, and outwardly by a white stripe; on the basal portions of all wings is a scattering of bright blue scales.

(b) Similar to above, but the blue scaling is extended and intensified so that it covers about two-thirds of the wing area, leaving only the costa, the apical area, and the distal margin of the fore wing fuscous. In some examples on the hind wing the blue reaches almost to the distal margin.

In the B.M. (N.H.) from BISMARCKS: New Britain; Feni I.; Witu (French I.); New Ireland; Duke of York I. SOLOMONS: Bougainville; Vella Lavella; Guizo I.; Choiseul I.; Alu, nr. Shortland I.; Rendova; Treasury.

(3) *A. paraffinis nissani* ssp. n.

(Pl. 1, figs. 31–32; Pl. 2, figs. 43–44)

♂. On the upperside, only differs from nominate race by the brighter, more intense purple lustre.

♀. The upperside is similar to that of the blue form of *p. paraffinis*, the blue colour being even denser and more extended with a resulting reduction in width of the fuscous discal margin of the fore wing, and causing the black submarginal spots on the hind wing to stand out clearly on the blue field.

In both sexes, the underside is characterized on all wings by a chalk-like whitish suffusion of the ground colour, which, though present in all parts of the wings is most intense between the median band and the submarginal markings. All the wing markings are dun coloured and contrast strongly with the whitish ground, thus forming a parallel development to that of *Catopyrops ancyra distincta* Tite (1963: 106) from the same habitat.

Holotype ♂. SOLOMONS: Nissan I., 1924 (*A. F. Eichhorn*), B.M. Type No. Rh. 18349.

Allotype ♀, as holotype, B.M. Type No. Rh. 18350.

Other examples in B.M. (N.H.), 3 ♂, 1 ♀.

(4) *A. paraffinis matthias* ssp. n.

(Pl. 1, figs. 29–30; Pl. 2, figs. 41–42)

♂. The upperside ground colour is of a lighter more reddish violaceous tint than is that of the otherwise very similar *p. paraffinis*.

♀. On the upperside like that of the nominate race, the colour varying individually from fuscous brown with a small basal admixture of blue scales to examples in which the blue colour extends over most of the wings.

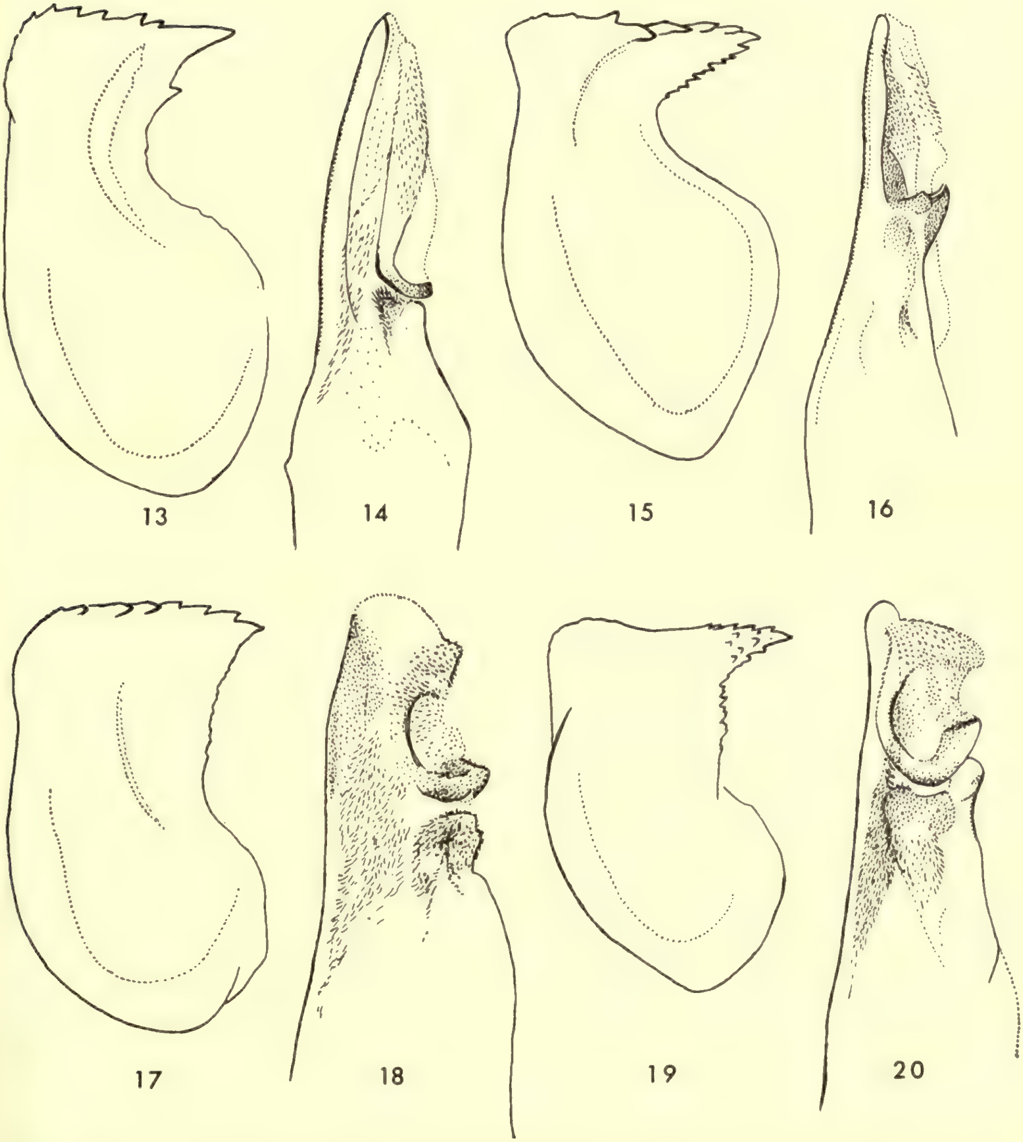
Underside in both sexes. The ground colour is pale grey-brown, much colder in tone than that of *p. paraffinis*; a distinct difference in colour, which is immediately observable on arranging a series of each subspecies side by side. The pattern of the spotting exhibits no distinctive character, but there is no trace of the white suffusion so evident in *p. nissani*.

In size it is consistently smaller than the nominate subspecies.

Holotype ♂. ST. MATTHIAS GROUP: St. Matthias I., vi.1923 (*A. F. Eichhorn*), B.M. Type No. Rh. 18351.

Allotype ♀. As holotype, vi–vii.1923, B.M. Type No. Rh. 18352.

Other examples in B.M. (N.H.) from ST. MATTHIAS GROUP: as holotype, 3 ♂, 6 ♀; Squally I., 7 ♂, 1 ♀, 1923 (*A. F. Eichhorn*).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FIGS. 13–20. Odd numbers clasper, even numbers aedeagus : 13–14. *Anthene lycaenoides* ; 15–16. *A. licates* ; 17–18. *A. lycaenina* ; 19-20. *A. villosa.*

(5) *A. paraffinis nereia* ssp. n.

(Pl. 1, figs. 33–34; Pl. 2, figs. 45–46)

Lycaenesthes emoloides nereia Toxopeus MS.

Both sexes are very similar to *p. paraffinis*, but they differ in the fore wing by having a slightly more obtuse apex and a more convex distal edge.

On the underside, the white edges of the spots forming the transverse median band are wider and more noticeable; the spots themselves are larger, and because of this appear to fuse with one another, giving the appearance of a solid band rather than a chain of separate spots.

♀. The blue scaling on the upperside is present in all examples seen, but it is of a subdued, more violaceous hue than that found in females of *p. paraffinis*.

As Toxopeus labelled an example of *p. paraffinis* from Guizo Island as allotype, a female as listed below has been designated.

Holotype ♂. SOLOMONS: Guadalcanar, v.1891 (*A. S. Meek*), B.M. Type No. Rh. 18353.

Allotype ♀. As holotype, iv.1891, B.M. Type No. Rh. 18354.

Other examples in B.M. (N.H.) from SOLOMONS: as holotype, 1 ♂; Guadalcanar, 1 ♂, 1 ♀ (*Woodford*); Gela (= Guadalcanar) or Guadalcanar without further details, 9 ♂; Florida I., 2 ♂; Tulagi, 1 ♂, 1 ♀; Ugi, 1 ♂, 1 ♀ (*G. F. Mathew*); Uru Bay, Malaita, 2 ♂ (*Woodford*).

Anthene philo (Hopffer)

(1) *A. philo philo* (Hopffer) **comb. n.**

(Text-figs. 6, 23, 24)

Lycaena philo Hopffer, 1874: 27, ♂.
Lycaenesthes leocrates Hewitson, 1878: 220, pl. 90, figs. 5 and 10, Macassar, (Type!), ♀.
Lycaenesthes philo f. *praeclara*, Fruhstorfer, 1923: 897, Kalawara.

It is most probable that *emolus*, *philo*, and *seltuttus* are of common stock, and each so far as is known inhabits separate territory. In spite of this, they do each exhibit constant differences in both pattern of the markings on the underside, and in the formation of the valves. These facts serve to indicate that the divergence has reached a stage that renders treatment as separate species desirable.

This species and *lycaenolus* can be instantly recognized from other members of the genus by the arrangement of the spots forming the median band on the underside of the fore wing; spots 1, 2, and 3 are in echelon, spot 3 being nearest the distal margin; spot 4 is placed inwards towards the base of the wing; spot 5 is placed outwards; spot 6 is placed well inwards. This arrangement gives the whole band a most distinctive sinuous appearance.

Fruhstorfer described the form *praeclara* from Kalawara to the south of Palu (Paloe), stating that it is larger, lighter above, and with more rounded hind wings. The only example from that locality in the B.M. is not noticeably lighter in colour, but it is certainly rather large, and has rounded hind wings.

In B.M. (N.H.) from CELEBES: Bangkei, 1 ♂, 1885 (*H. Kuhn*); Saleyer, 1 ♂ (*Fruhstorfer*); South and East Celebes, 16 ♂, 4 ♀ (including type of *leocrates* from Makassar). SULA ISLANDS: Sula Mangoli, 6 ♂, x.1897 (*Doherty*); Ufola, Mangoli, 3 ♂, xi.1897 (Crowley Bequest). TOEKAN BESI: Binongka, 1 ♂ (*Kuhn*).

(2) *A. philo scintillans* ssp. n.

(Pl. 1, fig. 38 ; Pl. 2, fig. 50)

Lycaenesthes emolus scintillans, Toxopeus, MS.

♂. The upper surface scarcely differs from that of the nominate subspecies, examples in the B.M. only showing a more vivid shining purple colour. On the under surface, on all wings the general tone is slightly deeper brown, and the submarginal spots and lunules are more clearly marked. All the spots forming the median band are much larger, and exhibit a greater tendency to coalesce ; the double spot in area 1 of the fore wing is extended inwards towards the base, forming a rough representation of a heart. All the markings are clearly emphasized by white rings. The tornal spot on the hind wing is narrowly margined inwardly by a dingy orange lunule.

♀. On the upper surface, the ground colour is rich nigger-brown, deeper in tint than that of Celebes females. The under surface is similar to that of the males.

Holotype ♂. TALAUT : ii–iii.1892 (*Doherty*), B.M. Type No. Rh. 18355.

Allotype ♀. As holotype, B.M. Type No. Rh. 18356.

Other examples in B.M. from TALAUT : as holotype, 5 ♂. SANGIR : 6 ♂, 1 ♀, ii–iii.1892 (*Doherty*) ; 1 ♂ (*Rosenberg*).

Anthene lycaenolus sp. n.

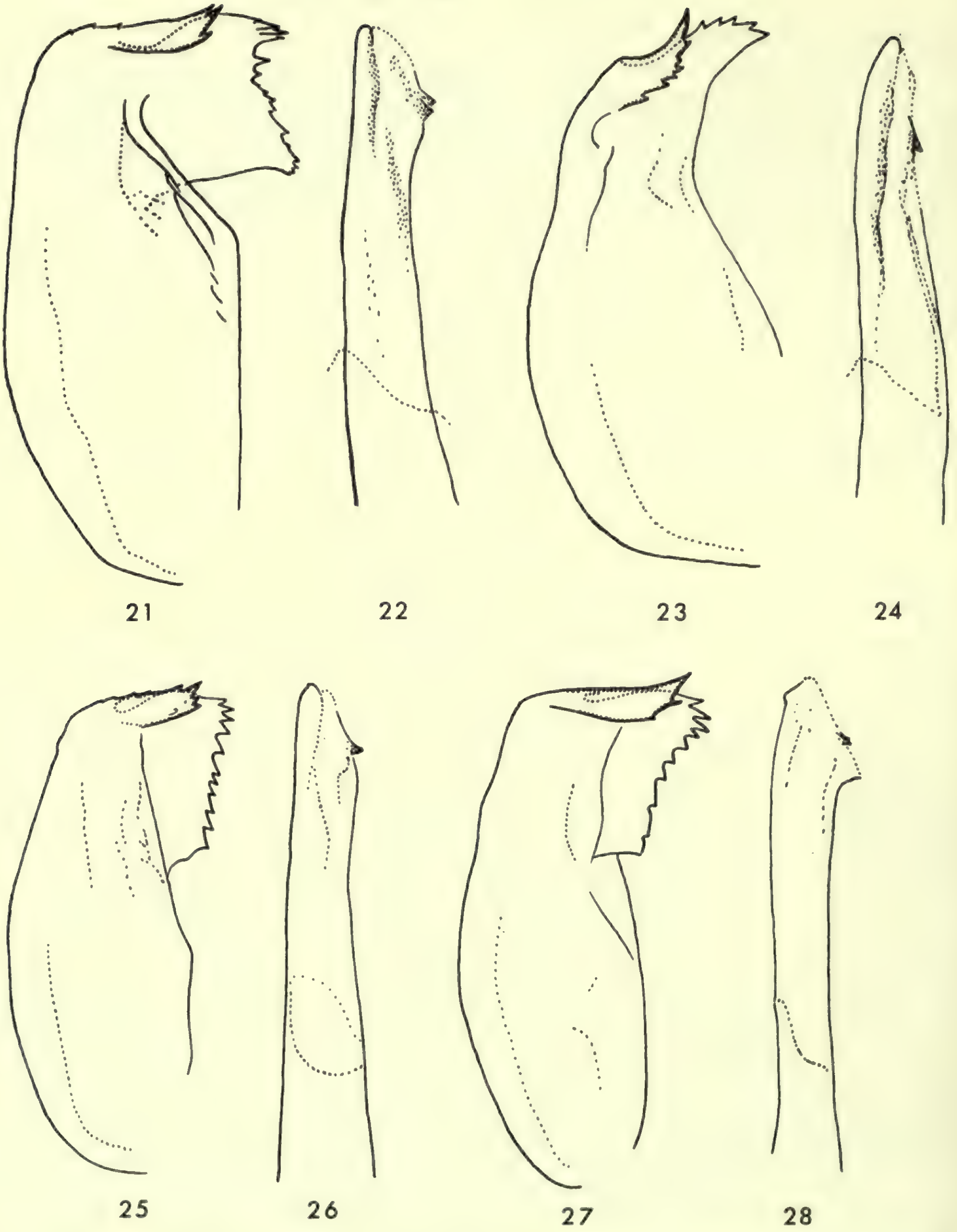
(Pl. 1, fig. 39 ; Pl. 2, fig. 51)

Lycaenesthes lycaenolus Toxopeus MS.

From the material available, it is not possible to be sure of the true status and affinities of this insect. The male genitalia are not to be differentiated from those of *philo*. The exterior, although exhibiting most of the characters of *philo*, is distinctive enough to suggest a subspecific separation, were it not for the fact that the species in question is apparently already represented in Talaut by *philo scintillans*. Possibly *lycaenolus* is just a form occurring together with *scintillans*, but this seems rather unlikely as no similar forms are to be found among the series from Sangir, Celebes, or the Sulu Islands. The labelling of all specimens concerned is not very detailed, and may possibly conceal the fact that *lycaenolus* actually does occur in isolation ; in view of these considerations, it is deemed advisable to treat it as a species until material with much more detailed data is available.

♂. The upperside is dull mauve, without any indication of the iridescence so characteristic of *p. scintillans*. On the hind wing, the submarginal black spots in areas 1 and 2 are vestigial or absent. The underside is much paler in tone ; all the median markings are in lesser contrast with the ground colour, being also less distinctly margined with white. The spots forming the median series are much smaller, rounder, and usually distinctly separate. In contrast, the submarginal spots on the hind wing are black, and stand out clearly, each on a clear near-white area which is bounded outwardly by the dark marginal line, and inwardly by the submarginal lunule ; except for the tornal spot in area 2, which is inwardly accompanied by a large orange red lunule of quite three times the extent of the similarly placed lunule in any of the *philo* subspecies.

♀. The upperside is brown with a slight tawny tint, on which the submarginal spots of the hind wing are more clearly defined than in that sex of *scintillans*. The fringes are dingy white, and the underside is like that of the ♂.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Figs. 21–28. Odd numbers clasper, even numbers aedeagus: 21–22. *Anthene emolus*; 23–24. *A. philo*; 25–26. *A. seltuttus*; 27–28. *A. paraffinis.*

Holotype ♂. TALAUT : (*Doherty*), B.M. Type No. Rh. 18357.

Allotype ♀. As holotype, ii–iii.1892, B.M. Type No. Rh. 18358.

Other examples in B.M. (N.H.) from TALAUT : as holotype, 6 ♂, 2 ♀.

Anthene lycaenina (Felder)

This species can be recognized by the rather acute apex of the fore wing, the definitely lavender hue of the upper surface in the male, and by the spot at the base of area 7 on the under surface of the hind wing being in the great majority of individuals black and punctiform ; the last named character must be used with caution, as in occasional examples this spot shows a transitional tendency towards the colour, size, and shape of that obtaining in other species of the genus.

Corbet (1938*a* : 250) in dealing with the subspecies *miya*, states that *lycaenina* is the Ceylon subspecies of *lycaenoides*. Examination of the genitalia of the type of *lycaenoides* proves beyond doubt that the two are not conspecific, and the name *lycaenina* is the oldest name for the species under discussion.

(1) ***A. lycaenina lycaenina*** (Felder)

(Text-figs. 3, 17 and 18)

Lycaenesthes lycaenina Felder, 1868 : 281, Ceylon.
Lycaenesthes orissica Moore, 1884 : 23, Orissa.
Anthene lycaenina (Felder) Cantlie, 1963 : 67.

In B.M. (N.H.) from Ceylon and South India.

(2) ***A. lycaenina lycambes*** (Hewitson)

Lycaenesthes lycambes Hewitson, 1878 : 220, pl. 90, figs. 11–12, North India (Type !).
Anthene lycaenina lycambes (Hewitson) Cantlie, 1963 : 67.

In B.M. (N.H.) from NW. India, Sikkim, Assam, Burma, Laos, and Hainan.

(3) ***A. lycaenina miya*** (Fruhstorfer)

Lycaenesthes lycaenina miya Fruhstorfer, 1916 : 101, Borneo ; NE. Sumatra.
Anthene lycaenoides miya (Fruhstorfer) Corbet, 1938*a* : 249.
Anthene lycaenoides miya (Fruhstorfer) ; Corbet, 1956 : 291.

In B.M. (N.H.) from Andamans, Siam, Malaya, Sumatra, and Borneo.

(4) ***A. lycaenina togata*** (Fruhstorfer)

Lycaenesthes lycaenina togata Fruhstorfer, 1916 : 101, Lombok.
Lycaenesthes lycaenoides bogorensis Toxopeus, 1929 : 219, E. Java. **syn. n.**
Anthene lycaenina togata (Fruhstorfer) Corbet, 1938a : 250.

In B.M. (N.H.) from Java, Lombok and Sumbawa.

(5) ***A. lycaenina villosina*** (Fruhstorger) **comb. n.**

Lycaenesthes lycaenina villosina Fruhstorfer, 1923 : 898, Luzon.

Represented in the B.M. (N.H.) by three very ancient examples, all of which on the underside of the hind wing have the spot in the base of area 7 lozenge-shaped and coloured as are the other spots.

In B.M. (N.H.) from LUZON : 1 ♂ (ex Semper).

Anthene lycaenoides (Felder)

Both sexes can be readily distinguished by the unbroken median band on the underside of the fore wing. The ♂ is similar in shape and colour to that sex of *lycaenina*, but the ♀ differs by the presence of a white discal patch on both upper and under side of the fore wing.

(1) ***A. lycaenoides lycaenoides*** (Felder)

(Text-fig. 1)

Dipsas lycaenoides Felder, 1860 : 454, Amboina, (Type !).
Anthene lycaenoides (Felder) Corbet, 1956 : 457.

In B.M. (N.H.) from Amboina, Ceram, and Ceram Laut.

(2) ***A. lycaenoides pegobates*** (Holland) **comb. n.**

Lycaenesthes pegobates Holland, 1900 : 71, Buru.

In B.M. (N.H.) from Buru, Halmaheira, Ternate and Obi.

(3) ***A. lycaenoides sutrana*** (Fruhstorfer) **comb. n.**

Lycaenesthes lycaenina sutrana Fruhstorfer, 1916 : 102, Snow Mountains, Dutch New Guinea, (Type !).

In B.M. (N.H.) from Key Islands, and New Guinea.

(4) ***A. lycaenoides godeffroyi*** (Semper) **comb. n.**

(Text-figs. 13–14)

Lycaenesthes godeffroyi Semper, 1879 : 165, Bowen.
Lycaenesthes turneri Miskin, 1890 : 39, Cape York.
Lycaenesthes turneri Miskin; Waterhouse, 1903: 199 [=*L. godeffroyi* Semper].

In B.M. (N.H.) from Queensland.

Anthene licates (Hewitson)

The formation of the aedeagus and claspers together with the superficial characters given in the key serve to illustrate the specific separation of *lycaenoides*, *licates* and *villosa*.

(1) *A. licates licates* (Hewitson)

(Text-figs. 4, 15 and 16)

Lycaenesthes licates Hewitson, 1874 : 350, Makassar, (Type !).
Lycaenesthes lycaenina licates Hewitson ; Fruhstorfer, 1916 : 101, (part.).
Anthene licates (Hewitson) Corbet, 1938a : 249.

In B.M. (N.H.) from CELEBES : Makasser, 1 ♂ (*Hewitson Coll.*), (Type) ; Minehassa, 1 ♂, 1897 (*Semper Coll.*).

(2) *A. licates dusuntua* Corbet

Anthene licates dusuntua Corbet, 1940 : 40, Selangor, (Type !).

In B.M. (N.H.) from MALAYA : Dusuntua, Selangor, 2 ♂ (including type) (*W. H. Evans*) ; Kuala Tahan, 1 ♂ (*Evans*) ; Ginting Sempak, 1 ♂, v.1933 (Ex. F. M. S. Mus.) ; Malakka, 1 ♂, 1904 (*J. Waterstradt*). SUMATRA : Lebong Tandai, W. Sumatra, 4 ♂, 1923 (*C. J. Brookes*) ; NE. Sumatra, 2 ♂ (*Dr. Martin*).

(3) *A. licates addenda* (Fruhstorfer)

Lycaenesthes lycaenina addenda Fruhstorfer, 1916 : 101, Palawan.
Anthene licates addenda (Fruhstorfer) Corbet, 1938a : 250.

There are no specimens of this subspecies in the B.M., but from the description there can be little doubt that it is correctly placed here.

(4) *A. licates philetas* (Fruhstorfer), **comb. n.**

Lycaenesthes lycaenina philetas Fruhstorfer, 1916 : 102, Batjan.

Fruhstorfer's mention of the basal white stripes of the fore wing underside suggests that he was dealing with a race of *licates*.

In B.M. (N.H.) from MOLUCCAS : Laiwui, Obi, 1 ♂, ix.1897 (*Doherty*). NEW GUINEA : Momi Coast (= Wariab), Arfak Pen., 1 ♂, 1928 (*Dr. E. Mayr*) ; Kapaur, low c., 1 ♂, 1896–7 (*Doherty*).

Anthene villosa (Snellen) **comb. n.**

(Text-figs. 5, 19 and 20)

Pseudodipsas villosa Snellen, 1878 : 24, pl. 1, fig. 6.
Lycaenesthes lycaenina licates Hewitson ; Fruhstorfer, 1916 : 101, (part.).

Fruhstorfer assumed from Snellen's description and figure that *villosa* was a synonym of *licates*. Comparison of Hewitson's type and the Celebes material in the B.M. makes it clear that *villosa* is a distinct species, differing not only as stated in the key, but showing also distinctive characters in the shape of the claspers and of the aedeagus.

In B.M. (N.H.) from CELEBEAN REGION : Sangir, 1 ♀, 1892 (*Doherty*) ; Talaut, 1 ♂, 1892 (*Doherty*) ; Siao, 1 ♂, 1896 (*Doherty*) ; South Celebes, 16 ♂, 1 ♀ (various) ; Tawaya, N. of Palos Bay, 1 ♂ (*Doherty*).

As the next species was described as a *Lycaenesthes* it is included here.

Pseudodipsas rufimargo (Rothschild), **comb. n.**

(Pl. 1, fig. 40 ; Pl. 2, fig. 52. Text-figs. 2, 9 and 10)

Lycaenesthes rufimargo Rothschild, 1915 : 390, Vulcan Island, (Type !).

Examination of the unique holotype reveals that the species cannot be retained in the genus *Anthene*, and that in fact it is closely allied to *Pseudodipsas digglesii* Hewitson.[1] The characters substantiating this are : the eyes are naked ; the palpi are covered with compact scales giving a smooth effect, whereas those of *Anthene* are hair-like and give a shaggy appearance ; the terminal joints of the palpi are shorter than those of *Anthene* ; on the hind wing, veins 2, 3, and 5 are shorter ; there are no indications of the tornal hair tufts so characteristic of *Anthene*.

The inclusion of this species in *Pseudodipsas* may be only a temporary expedient ; both *rufimargo* and *digglesii* exhibit certain characters in common, differing from those of the type species of *Pseudodipsas* (*eone* Felder) to a degree which might be considered sufficient to justify generic separation therefrom.

Some difficulty has been encountered in attempting to reconcile the original description with the characters exhibited by the type ; therefore a more detailed description of the underside is given below, omitting the points already mentioned.

Underside ♂. On the fore wing, the ground colour is pale grey-brown, having a slight satin-like texture, quite unlike that of *Anthene*. The submarginal markings are almost identical with those of *digglesii*, consisting of a series of fine dark lunules, the lunule in area 1 being expanded into an irregularly shaped patch. The pattern in the disc consists of rounded spots, of a deeper shade of the ground colour, each enclosed by a dingy white ring. These spots are arranged in three transverse series as follows : there are two spots placed one above the other in the cell ; the discoidal spot is large, above it being two small obliquely placed elongate spots in areas 7 and 9 respectively, and below it a tiny spot in the base of area 3, followed by a larger one in the base of area 2 ; beyond these, is the median band consisting of 5 spots placed in areas 2–6, those in areas 2 and 3 being nearer to the margin than are those in areas 4–6.

The hind wing is coloured like the fore wing ; its margins are very like those of *digglesii*, having dark submarginal lunules, each accompanied distally by an orange spot ; these orange spots are each edged outwardly with metallic silvery blue. The ends of veins 1 and 2 each bear a black spot. In the disc, there are four series of rounded spots arranged thus : a basal series, consisting of a spot near the costa, two conjoined spots in the cell, and a fourth below the median vein ; next, a curved series of irregularly shaped and partly coherent spots running from below vein 1, through the cell, and terminating with an oval spot in area 7 ; then, a series of three spots, the first at the base of area 2, the next at the discoidal, and the third in area 7 near the costa ; lastly a series of 8 spots, forming a band and broken at veins 2 and 7.

The formation of the genitalia is very similar to that of *digglesii*, the main difference being the absence of a pronounced saccus.

In B.M. (N.H.) from NEW GUINEA : Vulcan Island, 1 ♂ (holotype), 1913–4 (*Meek*).

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INDEX

(Synonyms are shown in *italics*)

addenda (Fruhstorfer), Anthene licates ssp., 271
affinis (Waterhouse & Turner), Anthene seltuttus ssp., 262
amboinensis (Butler), Anthene seltuttus ssp., 261
andamanicus (Fruhstorfer), Anthene emolus ssp., 259
ANTHENE Doubleday, 256
aruana Butler, Lycaenesthes, Anthene seltuttus ssp., 262

balliston Hübner, Lampides, Anthene emolus syn., 257
bengalensis Moore, Lycaenesthes, Anthene emolus syn., 257
bogorensis Toxopeus, Anthene lycaenina togata syn., 269

dusuntia Corbet, Anthene licates ssp., 271

emoloides ssp. n., Anthene paraffinis ssp., 263
emolus (Godart), Anthene, 257

goberus (Fruhstorfer), Anthene emolus ssp., 259
godeffroyi (Semper), Anthene lycaenoides ssp., 270

javanus (Fruhstorfer), Anthene emolus ssp., 259

keyensis ssp. n., Anthene seltuttus ssp., 261
klanga (Corbet), Nacaduba, Anthene emolus syn., 257

leocrates Hewitson, Lycaenesthes, Anthene philo syn., 266
licates (Hewitson), Anthene, 270, 271
LYCAENESTHES Moore, 256
lycaenina (Felder), Anthene, 269
lycaenoides (Felder), Anthene, 270
lycaenolus sp. n., Anthene, 267
lycambes (Hewitson), Anthene lycaenina ssp., 269

matthias ssp. n., Anthene paraffinis ssp., 264
minor (van Eecke), Anthene emolus ssp., 259
miya (Fruhstorfer), Anthene lycaenina ssp., 269
modesta (Staudinger), Anthene emolus ssp., 259
modestus (Waterhouse), Lycaenesthes, Anthene seltuttus, syn., 262

nereia ssp. n., Anthene paraffinis ssp., 266
nissani ssp. n., Anthene paraffinis ssp., 264

orissica Moore, Lycaenesthes, Anthene lycaenina syn., 269

paraffinis (Fruhstorfer), Anthene, 263
pegobates (Holland), Anthene lycaenoides ssp., 270
philetas (Fruhstorfer), Anthene licates ssp., 271
philo (Hopffer), Anthene, 266
praeclara (Fruhstorfer), Anthene philo f., 266
PSEUDODIPSAS, 272

rufimargo (Rothschild), Pseudodipsas, 272

scintillans ssp. n., Anthene philo ssp., 267
seltuttus (Röber), Anthene, 259, 262
sutrana (Fruhstorfer), Anthene lycaenoides ssp., 270

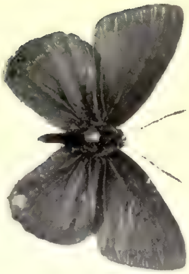
togata (Fruhstorfer), Anthene lycaenina ssp., 269
turneri Miskin, Lycaenesthes, Anthene lycaenoides godeffroyi syn., 270

villosa (Snellen), Anthene, 271
villosina (Fruhstorfer), Anthene lycaenina ssp., 270
violacea (Butler), Anthene seltuttus ssp., 262

PLATE 1

(Uppersides)

FIG. 29. *Anthene paraffinis matthias*, ♂, B.M. Neg. No. 41099.
FIG. 30. *A. paraffinis matthias*, ♀, B.M. Neg. No. 41101.
FIG. 31. *A. paraffinis nissani*, ♂, B.M. Neg. No. 41105.
FIG. 32. *A. paraffinis nissani*, ♀, B.M. Neg. No. 41103.
FIG. 33. *A. paraffinis nereia*, ♂, B.M. Neg. No. 41111.
FIG. 34. *A. paraffinis nereia*, ♀, B.M. Neg. No. 41109.
FIG. 35. *A. paraffinis emoloides*, ♂, B.M. Neg. No. 41113.
FIG. 36. *A. paraffinis emoloides*, ♀, B.M. Neg. No. 41118.
FIG. 37. *A. seltuttus seltuttus*, ♂, B.M. Neg. No. 41107.
FIG. 38. *A. philo scintillans*, ♂, B.M. Neg. No. 41095.
FIG. 39. *Anthene lycaenolus*, ♂, B.M. Neg. No. 41097.
FIG. 40. *Pseudodipsas rufimargo*, ♂, B.M. Neg. No. 41093.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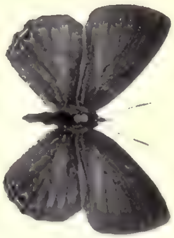
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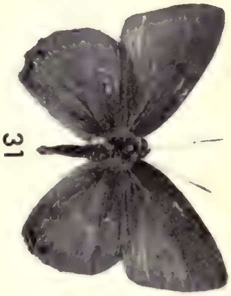
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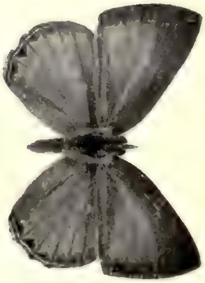
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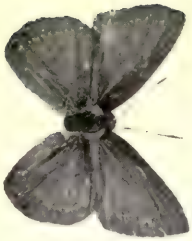
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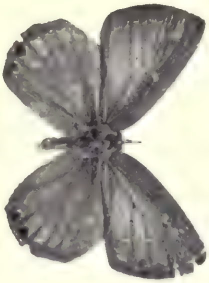
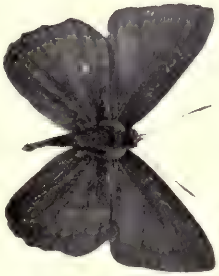

34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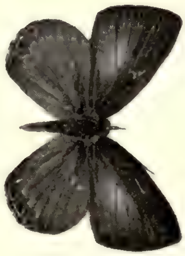
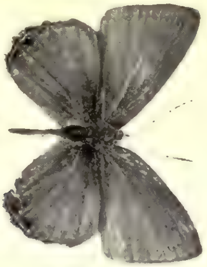

36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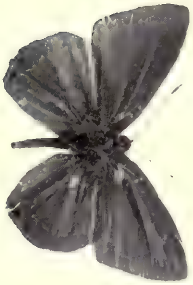
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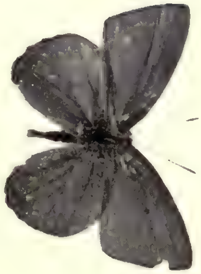

39

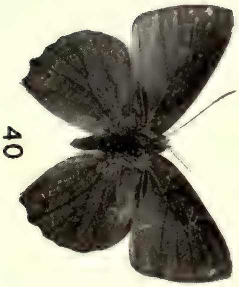
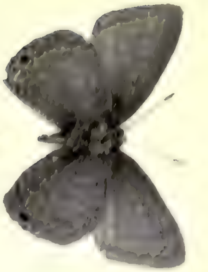

40

PLATE 2

(Undersides)

Fig. 41. *Anthene paraffinis matthias*, ♂, B.M. Neg. No. 41100.
Fig. 42. *A. paraffinis matthias*, ♀, B.M. Neg. No. 41102.
Fig. 43. *A. paraffinis nissani*, ♂, B.M. Neg. No. 41106.
Fig. 44. *A. paraffinis nissani*, ♀, B.M. Neg. No. 41104.
Fig. 45. *A. paraffinis nereia*, ♂, B.M. Neg. No. 41112.
Fig. 46. *A. paraffinis nereia*, ♀, B.M. Neg. No. 41110.
Fig. 47. *A. paraffinis emoloides*, ♂, B.M. Neg. No. 41114.
Fig. 48. *A. paraffinis emoloides*, ♀, B.M. Neg. No. 41116.
Fig. 49. *A. seltuttus seltuttus*, ♂, B.M. Neg. No. 41108.
Fig. 50. *A. philo scintillans*, ♂, B.M. Neg. No. 41096.
Fig. 51. *A. lycaenolus*, ♂, B.M. Neg. No. 41098.
Fig. 52. *Pseudodipsas rufimargo*, ♂, B.M. Neg. No. 41094.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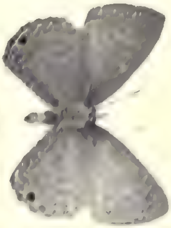
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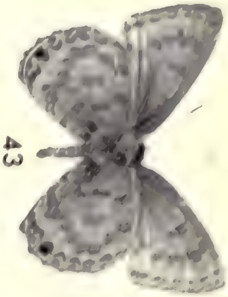
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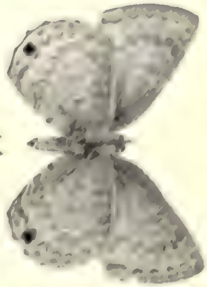
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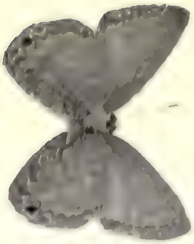
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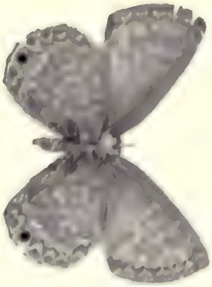
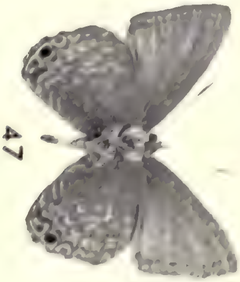
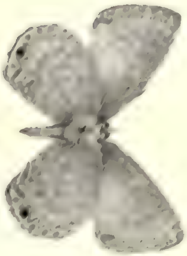
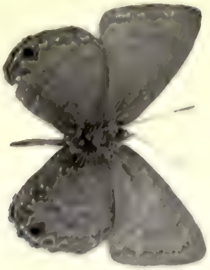

46


47


48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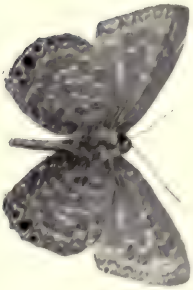
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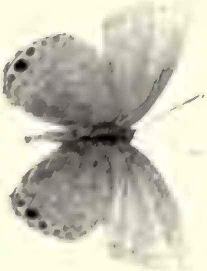
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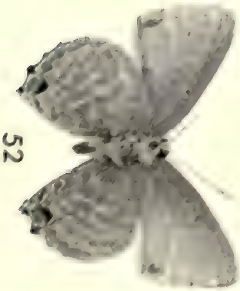
52

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REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE)

PART IV

V. G. L. van SOMEREN

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
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REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE)
PART IV

BY

V. G. L. van SOMEREN

P.O. Box 24947, Karen, Kenya

Pp. 277–316 ; 4 *Maps*, 9 *Plates*

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ENTOMOLOGY Vol. 18 No. 9
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REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE) PART IV

By V. G. L. van SOMEREN

CONTENTS

	Page
Synopsis	279
1. *Charaxes ethalion* Boisduval and its subspecies	279
Descriptions and Notes	281
Systematic list	299
2. *Charaxes ansorgei* Rothschild and its Subspecies	301
Descriptions and Notes	303
Systematic list	310
3. *Charaxes pollux* Cramer and its Subspecies	311
Descriptions and Notes	311
Systematic list	315
Acknowledgements	315
References	316
Appendix	316

SYNOPSIS

Three species of the genus *Charaxes* are dealt with and eleven new subspecies and five new forms are described.

1. *CHARAXES ETHALION* BOISDUVAL AND ITS SUBSPECIES

When we revised the *Charaxes etheocles-viola-ethalion* complex, (van Someren & Jackson, 1952 : 8, 1957 : 23) we referred very briefly to the species *ethalion* Boisduval ; this was due to the paucity of material from many areas of its range. This deficiency has, in part, been made good in recent years by the use of the modern methods of " trapping " adopted by most collectors in South, Central and East Africa. A great deal of additional material has come to hand and has been made available for study.

The species occurs from the eastern Cape Province north through Natal, Rhodesia, and Zambia to Malawi, then through parts of Tanzania to south-west Uganda in the west, and eastward up the east coast of Kenya almost reaching the southern border of Somalia, then northward to the southern border of Ethiopia at Mt. Marsabit to the east of Lake Rudolf. There are however some apparent breaks in the distribution, but to what extent this is due to natural ecological barriers, or to lack of collecting in these blank areas, it is difficult to determine. (Vide Map 1.)

The original description is based on a female from Natal ; there is no mention of the male sex. Rothschild & Jordan (1900), cite a male mentioned by Butler (1896 : 360) as the male of *ethalion*. Butler (1895) however, associated this male with his *Charaxes etheocles rosae*. Rothschild & Jordan (1900 : 487) also treated *rosae* as a female of *etheocles*. We were fully satisfied on geographical grounds and by an examination of the type, that it is a female of *ethalion*. This has been proved by breeding: a female of form *ethalion* produced offspring of forms *ethalion* and *rosae* and typical male *ethalion*.

Rothschild & Jordan (1900 : 479) give a full synonymy and refer to the variations in the female f. *ethalion* and figure two examples, pl. 12, fig. 4 being a broad-banded variation and fig. 6 a blue-spotted and barred form to which Rothschild does not give a form name; this specimen came from Taveta in Kenya. It resembles *swynnertoni* Poulton (1919 : 79) from Rhodesia. These three authors failed to recognize *rosae* as a form of *ethalion*.

van Someren & Jackson (1952 : 260) enumerated the female forms which were then recognized and indicated their distributions according to the material available.

The following alterations in status were made:

1. *rosae* Butler, 1895, originally described as a species but subsequently placed to *etheocles* by Rothschild & Jordan, was reduced to a female form of *ethalion*;
2. *ethalionoides* Carpenter, 1945, described as a form of *etheocles* was transferred to a form of *ethalion*;
3. the name *rosa* van Someren, 1932 became a synonym of *rosae* Butler since this is now considered an *ethalion* (*vide* 1 *ante*).

van Someren & Jackson, 1952 : 260 added the female f. *howardi* to the *ethalion* group of the Chepalungu Forest, Sotik, Kenya. We also described ssp. *alpinus* from the higher altitudes of the Vumba Mts., Rhodesia.

The material in the British Museum (Natural History), including the Joicey and Rothschild Bequests, was rearranged according to this regrouping in 1956. With additional material available, especially from Zambia, Malawi and Tanzania, it is now possible to study the species in more detail.

If the specimens are arranged geographically, it is at once apparent that the males differ hardly at all on the upperside throughout the range of distribution, that the number of female forms varies in each area, and that the basic female forms are: f. *ethalion*, f. *swynnertoni*, and f. *rosae*, each somewhat modified within the distribution of the species from south to north.

A close study of the material seems to indicate that the species *ethalion* has not evolved very far along the lines of subspeciation, though there would appear to be some degree of limitation and segregation of female forms. There is evidence to show that environment has played a part in modifying both size and pattern, thus we note that *ethalion* of the dry thorn bush country is generally small and is thus an ecological strain, not a subspecies in the true sense, for savanna merges into forest either abruptly or gradually. Conversely, *ethalion* of the higher forests with considerable precipitation tend to be larger and more brightly and intensely coloured. However, complete isolation of the insect on Mt. Marsabit in the Northern Frontier District of Kenya has resulted in the development of a race with only one known female form with strong characteristics.

There are however other regional groups of *ethalion* which exhibit considerable divergence from the nominate form yet are basically the same, and others which, though having the three basic female forms, have in addition extreme modifications of them. Some of these regions are well separated and *ethalion* within them constitute a " breeding community ", and one must assume that there is genetical control over the female forms in each. However, this complexity, and often similarity of forms, makes it difficult to divide the species into subspecies or geographical races in the orthodox manner. The alternative is to recognize each " breeding community " as a genetical group. To facilitate the comparative study of this complex, I have divided the species into geographical groups by regions, and each region into areas. Each region has, to a greater or lesser degree, some isolation and a differing ecological environment.

Emphasis has been placed on the fact that throughout the greater part of the range of this species, the three basic forms of females, f. *ethalion*, f. *rosae* and f. *swynnertoni*, occur in part or whole, either similar to the typical form or somewhat modified. To appreciate the variation in these forms to the best advantage, it is advisable to compare each separately.

In this revision, the insect designated by van Someren & Jackson (1957 : 42) as *ethalion alpinus*, from the Vumba Mts., Rhodesia, is omitted. I now treat it as a species with a race inhabiting the Nyika Plateau, Malawi, and these will be dealt with in another paper.

COMPARATIVE DESCRIPTIONS OF MEMBERS OF EACH GROUP

GROUP 1

Charaxes ethalion ethalion Boisduval

(Pl. 1, figs. 1–2, Map 1)

Charaxes ethalion Boisduval, 1847 : 593 [♀].
Charaxes rosae Butler, 1896 : 360 [♂ partim].

MALE. General shape of wings short and broad ; fore wing length 30 mm. (average) ; outer border hardly at all incurved, in some specimens almost straight. *Upperside*. Forewing, ground colour velvety black without sheen ; either immaculate or with a trace of a bluish spot subcostal beyond end of cell, and with one or two obscure upper subapical spots ; no glaucous border to the wing, but edge with a distinct white fringe hardly broken by the dark ends of the veins, this white line very obvious in side lighting. Hind wing almost immaculate except for traces of a submarginal row of small white dots, often limited to area above upper tails, usually double at anal angle where the spots may be lilac with white central dot. Border of wing may be slightly maroon above upper tail, or maroon mixed with olive, then olive to anal angle, where the olive scaling is expanded ; extreme edge black with slight indication of white fringe. Tails usually straight and slender, of about equal length, upper 5, lower 6 mm. *Underside*. Ground colour dark ashy-grey-brown with strong satiny sheen varying with direction of light but mostly in the disc of the fore wing and upper apical area ; a quadrate dark mark separates the apical satiny area from the discal ; the black marks on the basal half of the wing narrow but clear ; the lower part of the discal line outwardly strongly black ; the tornal double black spot well marked but not large, the black scaling extending half-way up the submarginal series of spots. Hind wings ground colour as fore, with the discal satiny bar strongly marked ; the postdiscal zigzag line usually well marked, olive and maroon in colour, inwardly defined by a black line ending above anal angle in a double or single crescentic black mark ; border reddish above upper tail then olive to anal angle which carries two black dots. It should be noted that the ground colour alters slightly with age, fresh specimens are dark while older ones tend to be more brownish (Pl. 1, fig. 1).

REGION 1. EASTERN SOUTH AFRICA, NATAL, ZULULAND, MOZAMBIQUE, RHODESIA.

♀ form ***ethalion*** Boisduval (Pl. 1, fig. 2)

Fore wing length 40–42 mm., size comparatively large with outer margin almost straight. *Upperside.* Fore wing, ground colour brown-black, darker in fresh specimens, with a strong blue sheen in side light. No spot in the cell, as a rule ; discal spots beyond end of cell, upper large, lower small or vestigal ; no spot in 4, but those from 3 to hind margin increasing in size so that the bar is pyramidal, but inner edge almost straight, white in colour with slight bluish scaling in 1b. The postdiscal spots white, arranged as follows : three subapical in line, spot in 4 set in, remaining spots in line with outer edge of wing, but spots tend to fade out in 2–1b. Hind wing discal bar comparatively wide, extending from the costa to above anal angle where it cuts across the lower part of the inner fold at right angles, disc of bar white or with slight bluish tinge on borders. Submarginal line white or bluish, interrupted by dark veins ; marginal border reddish above upper tails, then olive to anal angle ; anal angle greenish with double black dots ; extreme edge of wing blackish. *Underside.* Ground colour greyish brown with rufous tinge at base and distal portion of fore wing ; the light spots of upperside well represented, strongly in the disc but less marked in postdiscal line, but both rows accentuated by black proximally, though faint in postdiscal series ; tornal double spots black with more diffuse blackish spots in spaces above. Hind wing slightly more rufous in ground colour, but discal whitish bar strongly marked, widest at costa then tapering to 1c and represented above anal angle by a quadrate or triangular buffish mark ; postdiscal lunate marks accentuated in black proximally, buffish in upper half then more rufous, terminating above anal angle in a double black line with greenish in between ; submarginal line buffish to whitish, slightly outlined in black above upper tail then represented by black triangular marks and a double dot at anal angle ; admarginal line reddish above upper tails then olive to anal angle outlined distally with narrow white lines ; margin reddish brown. Tails long, upper one often spatulate at end, of almost equal length, 7 mm.

Range : General in Region 1, and almost the only form found south of the Tugela River (teste Pennington in litt.)

Variation 1. Differs from the nominate form by the larger white spots in fore wing from hind margin to 2 in discal line ; the bolder postdiscal spots which are contiguous with, or merge with the discal marks in 1b–2, the upper discal and postdiscal spots are often connected by diffuse whitish rays. Hind wing discal patch considerably wider throughout, often white, or with a slight bluish tinge on the borders. Underside drab greyish brown with slightly more brownish at bases and on the distal portion of the fore wing. The white marks of upperside of fore wing and the discal bar of hind wing distinct.

Range : Occurs sporadically in Region 1.

Variation 2a. Represents a very slight modification of the nominate form in that the upper spots of the fore wing are slightly tinged with ochre. The hind wing discal bar may be slightly widened in area of the cell, being angled on the outer border.

Range : General in region 1.

2b. ♀ form ***aurantimacula* forma n.** Similar to above but fore wing spots orange-ochre in upper half but whitish in lower portion of 1b and long mark in 1a. Underside rather generally rufous with upperside fore wing marks showing through and suffused over and indistinct, hind wing bar completely obscured. Size rather small, fore wing length 34–36 mm.

Range : Most specimens come from the Natal area and have been taken in the " dry season ". This form has been bred, but intergrades toward variation 2a and the nominate form are present in the same family.

2c. Similar to f. *aurantimacula*, equally small, fore wing length 35–36 mm. *Upperside*. The fore wing discal bar very narrow to 1b and only very slightly wider in 1a, the upper spots ochre, the rest white. Postdiscal spots limited to three subapical, remainder to 1b vestigial. Hind wing bar narrower than usual. Underside more rufous especially on distal portion of fore wing and over the whole of the hind wing, so that the discal bar is hardly visible.

Range : Natal area, mostly in " dry season ".

These three variants should not be confused with *ethalion* of the Port St. Johns area which constitutes a distinct subspecies and is dealt with later.

♀ form ***swynnertoni*** Poulton

(Pl. 2, Fig. 10)

Charaxes ethalion ♀ f. *swynnertoni* Poulton, 1918 : p. 79.

Attention was first drawn to this form by Rothschild & Jordan, 1900, when they figured a specimen taken at Taveta, Kenya. The type selected by Poulton came from Charinda, Melsetter, Rhodesia.

Size rather variable, majority with fore wing length 40–42 mm. Outer margin of fore wing straight or only very slightly incurved. *Upperside*. Ground colour blue-black, rather browner at bases of wings. Fore wing discal spots as follows : one medium and one very small beyond end of cell, spots from 3–1b not expanding rapidly but streak in 1a long, extending distad. Postdiscal series all of nearly equal size, three subapical in line, spot in 4 set well in, forming an angle with one above, remainder following the curve of the wing margin ; double spots in 1b free or just touching the discal spot in this area. Subapical spots may be white, rest blue. Hind wing discal band usually narrow at costa but expanding over cell area, then tapering to above anal angle where it cuts across the inner fold at right angles, colour dull bluish, slightly paler in the disc. Submarginal linear marks white or pale violet outlined distally in black ; marginal border reddish above upper tail then olive to anal angle, extreme edge black. Tails long and fine, of almost equal length, 6–7 mm. *Underside*. Grey-brown with a slight satiny band in the disc of fore wing, varying with the angle of light, richer rufous on the outer margin in some specimens. Hind wing with more rufous suffusion over whole area. The markings of upperside not very apparent but postdiscal series show up slightly. The tornal double black spot limited to 1b. In the hind wing the submarginal pale line shows up well and the zigzag postdiscal line is usually strong, especially in the lower half.

It should be noted that in newly emerged specimens, the upper side ground colour is darker.

Range : This form occurs sparingly in upper Natal, rare south of the Tugela, but more frequent in Rhodesia.

♀ form ***rosae*** Butler

(Pl. 1, figs. 3, 4 and 7)

Charaxes rosae Butler, 1895 : 255.

A comparatively large form with fore wing length 38–40 mm. but size variable. *Upperside.* Ground colour brownish black, more brownish in old specimens, with slight violet-blue sheen in side light. Disc of fore wing with a curved white band formed as follows : a triangular mark at end of cell, beyond three whitish streaks and some white scaling on costa ; a triangular mark at base of 3 followed by elongate marks in 2–1b, rounded at distal end, concave on proximal end followed by a narrow elongate mark in 1a on hind margin ; two oval white spots beyond end of cell, lower one sometimes small or vestigial. Postdiscal series : three subapical in line, spot in 4 set in slightly, followed by a spot in line 3. Hind wing base and distal border brownish black. Disc of wing crossed by a whitish band extending up to costa as a solid block and reaching to above the anal angle and crossing the inner fold at right angles. The band is usually white with a slight greenish blue flush over the cell area on inner border, and slightly on outer. *Underside.* Ground colour ashy-grey-brown, rather more rusty on distal part of fore wing and over the disc of the hind wing, but the pattern of upperside is reproduced in varying strength and may be obscured in the hind wing. The submarginal pale line well marked ; marginal red and olive border strong.

Range : This form is scarce south of the Tugela River, more plentiful in northern Natal to Beira and Rhodesia. It is subject to some variation within the range of the nominate race as follows :

Variation 1. Natal. Differs from the nominate form by a slight reduction in the width of the fore wing bar in 3, the absence of the second spot beyond the cell. In the hind wing the discal patch does not reach the costa and the patch is suffused all over with violet-blue.

Variation 2. Melsetter area. Large specimens with upperside fore wing curved band very wide even at the costa, the mark in 2 13 mm. long, those in 1a–1b equally long with very slight blue scaling proximad. Hind wing bar complete from costa to above anal angle, widest in 3–4, white throughout or with some blue scaling on distal border. *Underside.* With the pattern of upperside of fore and hind wings well represented.

Variation 3. Mt. Selinda. A small specimen with upperside fore wing curved bar tapering rapidly toward the costa ; only one spot beyond the cell ; three subapical spots white, small but distinct ; rest of postdiscal series only just visible. Hind wing band represented at costa by a bluish discal spot and two postdiscal, the bar comparatively narrow and strongly flushed over with lilac-blue. *Underside.* Only the fore wing curved bar represented ; the hind wing discal patch not showing in the almost uniform rufous grey ground.

Variation 4. Vumba. Small specimen very similar to Mt. Selinda example but upperside hind wing patch stops short at 4 and rather angled on outer aspect and represented at subcosta by a detached spot in the discal line, the whole patch suffused with lilac, but slightly paler in the upper proximal corner. *Underside.* Pattern of fore wing upperside reproduced clearly with an extension of the white scaling to include the two white spots beyond the cell end. In the hind wing the greyish brown ground colour hardly interrupted in the discal zone (Pl. 1, fig. 3).

GROUP 2.

PONDOLAND, PORT ST. JOHNS, BASHEE RIVER.

***Charaxes ethalion pondoensis* ssp. n.**

(Pl. 1, figs. 5, 6, 8 and 9, Map 1)

My attention was first directed to this race of *ethalion* in 1956, when it was noted that the males differed considerably from those of the nominate race in shape and underside coloration and the females exhibited characters which supported the suggestion that the Port St. Johns insects represented a distinct subspecies.

The material then available was very limited, but I have now received a full series of males and females from Messrs W. Teare and C. MacMaster which substantiate the validity of this supposition.

MALE. Fore wing length 32–33 mm., outer margin more incurved than nominate *ethalion*, thus apex definitely acuminate. *Upperside.* Ground colour velvety black ; fore wing without any blue marks or with small obscure subcostal mark beyond cell and one or two vestigial subapical dots ; margin without glaucous but white fringe strong. Hind wing with very small bluish white submarginal dots, double at anal angle ; margin maroon above upper tail, then olive to anal lobe. Tails short, often robust, of about equal length, lower slightly up-curved, 5 mm. *Underside.* Has a strongly variegated appearance, the ground colour being more greyish, slightly rusty tinged at base and outer border of fore wing, the satiny bars through apex of cell, the discal line and postdiscal zone set off by intervening darker bars ; the black lines in basal half clear ; the tornal double black marks strong with black marks in 1b strong. Hind wing black lines in basal half not strong ; the discal satiny bar offset by a dark brownish band proximal to the postdiscal zigzag line of olive and maroon, which is bordered by the submarginal greyish line ; border reddish above upper tail then more golden olive to anal angle.

FEMALE. Fore wing length 35–36 mm., outer margin slightly incurved at 3–4. *Upperside.* Ground colour black ; fore wing pattern strong, the spots being orange-ochre to orange-tawny ; the discal band rather narrow made up as follows : one large and one small subcostal in 5–6, a small spot set well in base 4 (sometimes absent), spots from 3–1b in increasing size followed by long streak in 1a. The marks in 1a and 1b slightly paler ochre. The postdiscal spots well developed and complete from costa to 1b, orange-tawny in colour and completely separate from the discal marks. Hind wing ground colour black, discal band rather restricted, extending from the costa to short of the anal angle where it fades out, centre of band white, inner border slightly blue, outer border strongly blue or mauvish blue. Submarginal line of spots not very strong, mauve with central white dots ; marginal border strongly reddish above upper tail, then olive to anal angle, edged black. Tails comparatively short, 6 and 5 mm. *Underside.* General colour greyish brown, more brownish at base and darker on outer border of fore wing ; the discal bar of upperside represented clearly in buffish white, the postdiscal spots in grey, both accentuated proximally by black lines ; tornal spots well marked, with dark marks in areas above fading out. Hind wing ground colour slightly more brownish, but discal band strongly indicated and bordered by brownish zones ; postdiscal zigzag lunate marks greenish with maroon distally and black line internally, strongly marked ; submarginal whitish line strong, accentuated distally in black, with triangular blue-black marks toward the anal angle. Marginal border reddish above upper tail then olive to anal angle.

Holotype male. SOUTH AFRICA : Pondoland, Port St. Johns (Transvaal Museum, Pretoria).

Allotype female. South Africa: Pondoland, Port St. Johns, Bashee River (Transvaal Museum, Pretoria).

Variation: Female similar to the nominate form but fore wing discal marks more restricted, the upper spots pale ochre, the lower ones to 1b white; the postdiscal spots fading out in 2 to hind angle.

It is interesting to note that this strongly orange-spotted female is the only form of female associated with the distinctive male in the Port St. Johns area of Pondoland. It bears some resemblance to the ochre-spotted variation of nominate female *ethalion* referred to as *aurantimacula* on p. 283.

This subspecies flies in association with *Charaxes karkloof* Van Someren & Jackson in the Port St. Johns area and the females have a superficial resemblance to one another.

GROUP 3.

***Charaxes ethalion nyasana* ssp. n.**

(Pl. 2, figs. 11–18, Pl. 3, 19–30, Map 1)

The species *ethalion* is represented in Malawi by a subspecies which, while having females very similar to the three basic forms found in the nominate race, has in addition several forms not occurring in any other race.

Male: Fore wing length 30–31 mm., outer margin almost straight, thus similar to nominate male *ethalion*. *Upperside*. Ground colour of both wings deep velvety black; fore wing immaculate or with very obscure bluish subcostal spot either beyond end of cell or in upper subapical area. Fringe narrowly white. Hind wing with submarginal spots obscured or apparent in region of tails, bluish to lilac with white central dots; border dull maroon above upper tail then olive to anal angle. Tails short, 4 and 5 mm. long, black with median green line. *Underside*. Drab greyish brown, rather browner on hind wing. Fore wing satiny sheen rather diffuse and not in distinct bars, but outer border darker brownish from tornal black spots, which are not very strong, to just below the apex; black lines in basal half clear but fine. Hind wing black lines in upper half fine; postdiscal zigzag olive and maroon line not strong except in lower half; border above upper tail red, then olive to anal angle.

Holotype male. Malawi: Nkata Bay (*J. D. Handman*). In B.M. (N.H.).

Females. The ethalion pattern forms in Malawi are, in the main, very similar to those of Group 1, but they are brighter; the ground colour is stronger and blacker and the amount of blue-green scaling at the base of the wing more in evidence.

Region 1. MALAWI.

FEMALES OF ETHALION PATTERN.

1. ♀ form ***nyasana***

A large form, fore wing length 40–42 mm. *Upperside*. Ground colour of fore wing blackish with a strong greenish sheen at base. Pattern generally similar to nominate *ethalion* but bolder; discal upper spots larger; there is a large diffuse whitish spot at end of cell and a spot at base of 4; white marks in 1a–2 wider. Postdiscal spots bold and complete from the subapex to 1b, where the mark merges with the discal mark. Hind wing discal bar wider, especially in mid position, the white limited to an oblique central bar widest at costa, the borders suffused with greenish blue, particularly basad. Submarginal line of whitish lilac linear marks rather diffuse as a rule, double anal marks lilac. Marginal border dull reddish above upper tail, then olive-green to anal angle. *Underside.* Greyish brown, satiny in disc but suffused with brownish on distal part of fore wing; discal and postdiscal white marks of above strongly represented in fore wing; hind wing suffused with rufous over the whole, so that the discal bar may be obscured or suppressed. Tails long and slender 7–6 mm. (Pl. 2, fig. 15.)

Variation a. *Upperside.* Pattern basically similar to the preceding, but the discal and postdiscal spots of the fore wing show an indication of being joined by rays.

Variation b. Somewhat similar to *var.* a. but fore wing spots other than those of 1a and 1b (which are white) are strongly tinged with ochre.

2. ♀ form

Upperside. Fore wing pattern as in *ethalion ethalion* but discal marks in 1a–1b wider and strongly blue-scaled at ends. Hind wing discal area strongly suffused all over with blue scaling except toward the costa, thus obscuring the usual white bar in mid area. *Underside.* Whitish marks other than those of 1a–1b suffused over with buffish grey, and obscuring the pattern. This variation appears to indicate some transition toward f. *swynnertoni.* Some specimens may have the fore wing discal and postdiscal spots in upper half tinged with ochre.

FEMALES OF SWYNNERTONI PATTERN.

The *swynnertoni*-like forms in Malawi divide up into four distinct forms, one of which does not appear to occur elsewhere; there are also some interesting variations apparently restricted to Malawi.

1. ♀ form **cithaeronoides forma n.**

(Pl. 3, figs. 25, 26, 28, 29).

On an average smaller than nominate *swynnertoni*, fore wing length 37 mm. (average). *Upperside.* Ground colour is a deeper black with strong dark blue or greenish blue sheen in side light. Fore wing pattern much as in the nominate *swynnertoni*, but the discal blue spots are brighter blue; there are two spots beyond the cell end, the upper large, lower smaller, both blue, spots in 3–2 well separated, the spot in 1b triangular so that the lower part of the bar expands rapidly, widest in 1a. The spots in upper part of 1b, 2–3 smaller than in *swynnertoni.* In the postdiscal row, the three upper subapical spots are conspicuously white and in line, spots in 3–4 set in at an angle to subapical, spots in 2–1b slightly larger and free of the discal marks; these spots are blue. Hind wing discal area bright blue, represented by costa by a spot in discal line, central whitish bar just visible. Submarginal elongate marks well developed white or bluish white; marginal border reddish above upper tail then olive to anal angle; extreme edge black. Because of the brighter blue contrasting with the black surround, the patch shows up brilliantly; the insect thus bears a strong resemblance to a small fresh specimen of *Charaxes cithaeron nyasae.* *Underside.* Ground colour grey-brown with a rusty flush on the distal part of fore wing, and over the disc of the hind wing. The subapical spots of fore wing show up, but the remainder of the upperside pattern is obscured; the tornal black marks are very distinct and accentuated by a paler surround. Hind wing black lines hardly visible, discal bar obscured, but the submarginal pale line is strongly marked and entire; marginal border reddish above upper tail, then olive to anal angle, with triangular black marks and a double spot at anal angle. (Pl. 3, figs. 26, 29.)

Holotype female. MALAWI: Mlosa Stream, Lauderdale, 23.ix.62 (*J. D. Handman*).

Paratypes: 3, same data as holotype.

2. ♀ form

Upperside. Very similar to f. *cithaeronoides* but discal bar in fore wing more strongly developed, wider and whitish blue; spots in 2–3 larger. Postdiscal spots whiter throughout. Hind wing discal patch whiter, less bright blue especially in upper half; submarginal line not so distinct, more greenish; marginal border with red scaling extending to lower tail, but olive at anal angle. *Underside.* Ground colour greyish brown, the discal marks of fore wing show up buff or whitish, more especially in 1–3. Hind wing discal patch obscured. (Pl. 3, figs. 25, 28.)

These specimens show an approach to nominate *swynnertoni* but at the same time suggest some influence of an *ethalion*-like strain in genetical make up.

3. ♀ form ***suppressa*** **forma n.**

(Pl. 3, figs. 20, 32)

Upperside. Resembling somewhat f. *cithaeronoides*, but base of fore wing with strong deep blue sheen. The discal bar completely suppressed except for a blue spot beyond end of cell, the long streak in 1a and a diffuse blue mark in 1b. The postdiscal spots are however very distinct, white from subapex to 2, blue in 1b. Hind wing discal band broad, whitish, but with strong blue sheen over all, or on distal border. Submarginal linear white marks well developed; marginal border reddish to upper tail, then olive green to anal angle. *Underside.* As in *cithaeronoides* or with even darker brownish coloration. (Pl. 3, figs. 20, 23.)

A very distinct form represented by several specimens.

Holotype female. MALAWI: Port Herald, Mlosa stream, 26.vii.62 (*J. D. Handman*).

4. ♀ form ***demaculata*** **forma n.**

(Pl. 3, figs. 21, 24)

This boldly marked variation is the converse of form 3 as regards the pattern of the fore wing; it appears to be an unusual form.

Upperside. Ground colour as in form 1, but with a greenish blue sheen over the base of the fore wing. Postdiscal spots limited to three subapical, rather indistinct, remainder completely obscured. The discal bar however is very pronounced and made up of two white spots beyond the cell, an arrow-shaped spot in 3, a larger spot in 2 rather angular, mark in 1b broader and at base as wide as streak in 1a, all pure white, but last two with strong greenish blue ends. Hind wing discal band comparatively narrow, whitish in upper half toward costa, strongly greenish blue on borders and over lower end, not extending through to inner fold but represented above anal angle by a free bluish mark. Submarginal line white; marginal border broadly red above upper tail, then olive to anal angle. *Underside.* Ground colour strongly rufous grey, more rusty on distal portion of fore wing; uniformly rufous shaded on hind wing. The fore wing discal bar strongly represented in 1a–3 in buffish white; the hind wing band hardly visible; the postdiscal zigzag line obscured in upper half but strongly maroon opposite the tails. Submarginal line present but most marked above tail area, where there are three black marks; marginal border reddish above upper tail, then olive to anal angle. (Pl. 3, figs. 21, 24.)

Holotype female. MALAWI: Lugeri Stream, Mlanje, 2.ix.62 (*J. D. Handman*).

FEMALES OF ROSAE PATTERN.

There are two main *rosae*-like forms in Malawi, 1., a large form in which the fore and hind wing light areas are *not* greatly in contrast, and 2., one in which the ground colour is intensely blue-black with some blue sheen over the basal area of fore wing the fore wing bar intensely white and in strong contrast to the strong blue of the hind wing patch. There is also an interesting variation which I describe below.

1. ♀ form near *rosae*.

In size and general facies this form is reminiscent of *rosae* of the nominate race. *Upperside*. Fore wing pattern is similar, the curved white bar extends into the upper part of the end of the cell, the inner curve of the bar is regular, the outer more irregular, two white spots, the second variable in size midway between the cell mark and the subapical spots of the postdiscal series which consists of 5 white spots, the lower two forming an angle with the subapical three in line. The long marks in 1a and 1b tinged with blue. The hind wing bar is fully represented at the costa as a block, it varies in width, usually fairly even on the outer border but irregular on the inner, widest in the region of the cell, may be whitish suffused with blue, with the oblique white showing up clearly or the white line may be obscured ; the lower part usually stops short of the inner fold above anal angle but is represented on the fold by a pale spot. The submarginal broken line of linear marks and the marginal border as in the nominate *rosae*. *Underside*. Rufous grey with slightly more rusty tinge on outer border of fore wing and over the disc of the hind wing. The base of the fore wing with rather strong black lines, and the curved bar of above strongly represented ; the hind wing patch is strong, while the postdiscal zigzag line of greenish maroon is especially strong in lower half ; marginal border as usual.

Comparative fore wing lengths are : Chintechi 40 mm., Mlaye 40 mm., Monkey Bay 38 mm. (Pl. 3, figs. 27, 30.)

Variation a. *Upperside*. Similar to the foregoing in the pattern of the fore wing but the marks in 1b–2 also broader than usual ; the costal portion of bar broad ; the long streak in 1a blue with this colour extending up the inner edge to 1b, the postdiscal spots elongate and larger than usual. The hind wing patch uniform pale blue and represented toward costa by two separate spots. The submarginal line conspicuous, the marginal red and green border wider than usual. A very ornate example, from Mlanje.

Variation b. *Upperside*. Fore wing curved bar almost uniform throughout, the white mark in 2–1b shortened at distal end, so that the postdiscal spots are increased to six, the lowest in 2 being just free of the discal mark. The hind wing patch does not extend to the costa and besides being narrower than usual, is pale blue, without signs of an oblique white discal line. The submarginal crescentic linear marks are almost contiguous ; the marginal border well-developed. Mlosa Stream, Mlanje.

Variation c. *Upperside*. Ground colour fore wing blacker, the curved white bar narrower than usual, the mark in 2 being half its usual length so that the postdiscal spot in this area is free. The two spots beyond end of cell and all the postdiscal series are strongly orange-ochre. The hind wing band goes through to the costa and at the tapered anal end touches the mark on the inner fold ; the band is suffused with mauvish blue but the oblique white discal bar is clearly visible toward the costa. Submarginal line of somewhat triangular marks mauve, with white central dots ; marginal border conspicuously red above upper tail, then olive to anal angle. *Underside*. Light brownish at bases of wings, black lines fine ; curved bar of above distinct, and beyond this the wing is strongly satiny brownish grey but the margin of wing strongly brownish ; the tornal spot large and black, with some brownish diffuse marks in spaces above distal to the postdiscal spots, which are slightly indicated.

This unusual specimen was taken on Kubula Hill, Blantyre (*H. McKay*).

2. ♀ form ***imitans*** **forma n.**

Pattern of fore and hind wing conforming more or less to f. *rosae* but considerably modified, the colour of fore and hind wings being in strong contrast.

Upperside. Fore wing length 36–38 mm. average 36 mm. Ground colour when fresh, a deep blue-black, with brighter blue sheen at base of fore wing in side light, distal portion black. Discal curved bar more solidly pure white, less broken by black veins on outer border; the costal portion of the bar is wide, since the subcostal streaks are extended distad to touch or merge with the two white spots beyond the cell end, as in the type specimen; the bar is constricted in 4 and is widest in 2, the streak in 1a is not however longer than the mark in 1b. In five specimens the postdiscal white spots are limited to the three subapical, the rest are vestigial or absent; (in only one specimen is the series complete to 3). The hind wing patch is rather narrow, represented at the costa by a blue mark in discal line, the outer border is thus curved, the inner margin is defined at the upper half, and diffuse in the lower, where it meets the inner fold; the whole patch is strongly suffused with blue scaling, especially strong on the margins, with high light in disc in side illumination but there is no clear white discal line. Submarginal linear white marks small but clear, greeny tinged at anal angle; marginal border maroon and olive green. Tails rather long and slender, 7 mm., upper one slightly spatulate at end, lower pointed. *Underside*. Ground colour darker than *rosae*, with a large satiny area in disc of fore wing, offset by a darker brownish distal border. Fore wing discal curved bar strongly marked but hind wing without indication of discal patch. Submarginal whitish to greyish line strong. Tornal black mark in fore wing strong. (Pl. 2, figs. 16–18; Pl. 3, figs. 19, 22.)

Holotype female. MALAWI: Lauderdale Est., Mlaye, Mlosa Stream, 5.ix.62 (*J. D. Handman*).

Paratypes. 4, Lugeri Stream, Mlanje; Mlosa Stream, Mlanje; Hynde Dam, Limbe; Swazi Est., Mlanje (*Handman & Martin*).

Variation a. A small specimen with the costal portion of fore wing curved bar less wide, so that whitish spot beyond the cell is free. The postdiscal spots are all more or less obscured. In the hind wing the discal blue patch is very restricted to the mid and lower portions only, and there is an obscure bluish spot on costa entirely free. Submarginal line of spots obscured above upper tail but distinct in lower half; marginal border as usual. Malawi, Mlosa Stream (*Handman*).

Variation b. The fore wing curved bar is very much reduced and tapers toward the costa, the two spots beyond the end of the cell entirely free, the distal portions of white marks in 1a–2 with black scaling obscuring the ends, the streak in 1a strongly blue. The hind wing discal blue patch reduced in upper half and represented by a blue spot in discal line at costa and in space below, the outer border is thus very angled. Chitakali Est., Mlanje (*Martin*).

The form *imitans* bears a resemblance to females of *Charaxes cithaeron nyasae* van Someren.

REGION 2. ZAMBIA, MUMBWA-LUSAKA.

FEMALES OF NYASANA PATTERN.

1. ♀ form *nyasana*.

A small form, fore wing length 34–36 mm. In general appearance very similar to form 2 of Malawi, but smaller. *Upperside*. Discal and postdiscal spots in upper half of fore wing, white, but those in 1a–1b suffused with blue scaling. Hind wing discal band rather wide for size of insect, strongly suffused with blue on borders and toward the anal angle, but white central bar usually visible. Submarginal line of spots not strongly indicated, but marginal border as usual. *Underside.* Ground colour rusty greyish, slightly more rufous over hind wing. Fore wing light marks apparent only in areas 1a–1b, and in the hind wing the discal bar is almost obscured. (Pl. 2, figs. 13, 14.)

This is a small savanna form, with a distinctly seasonal appearance.

2. ♀ form.

A single example from this region is identical with the *nyasana* ♀ form near *cithaeronoides* of the Malawi series.

♀ form near *imitans.*

A small form bearing a close resemblance to the type form described above. *Upperside.* The outer border of the curved bar in fore wing more irregular and with a strong blue suffusion on lower marks in 1b–1a especially distad. Hind wing band wider and whitish at costa but otherwise blue. Submarginal linear mauvish white marks strong; border as usual. *Underside.* Ground colour greyish brown, more rusty on border of fore wing; discal curved bar fore wing strongly represented, but hind wing band hardly indicated; submarginal linear marks very pronounced; tornal black marks on fore wing strong.

REGION 3, SOUTHERN TANZANIA, NEWALA, NORTH OF RUVUMA R. AND NJOMBE.

FEMALES OF NYASANA PATTERN.

♀ form near *imitans*

Very similar to form 2 of the Malawi series with *nyasana* pattern, with upper part of upperside fore wing curved bar wide and touching the spot beyond end of cell, but lower portion narrower, streak in 1a dull bluish. Hind wing patch not extending to the costa, but stopping at 6, uniform bluish.

Underside. As in Malawi form 2, but upper part of fore wing bar goes through to the spots beyond the end of cell. Basal black lines and tornal spot strong. Hind wing band not represented below, but submarginal pale line strong.

Variation : An attractive variation has the postdiscal spots and those beyond the end of the cell in the fore wing orange-ochreous. Tanzania : Rutumba Forest, Lindi area, 27.v.1965 (*McCleery*).

FEMALES OF SWYNNERTONI PATTERN.

1. ♀ form near *cithaeronoides.*

Upperside. Fore wing, lower blue spots in discal row obscured with blue scaling; hind wing band wide.

2. ♀ form near *swynnertoni.*

Upperside. Fore wing discal and postdiscal marks strong and well separated; hind wing band narrow, greenish blue. The associated male is very similar to that of *ethalion nyasana.*

3. ♀ form near *citheronoides.*

Upperside. Agreeing with f. *cithaeronoides* of the Malawi area but fore wing discal band less abruptly expanding in areas 1a–1b and the streak in 1a not so long, the postdiscal double mark in 1b is free and not merging with discal mark. The postdiscal spots are distinct, the four upper white, the rest bluish white. Hind wing discal patch wider and represented at the costa by a quadrate off-white mark, borders strongly blue-scaled, the white oblique bar rather diffuse. Submarginal white linear marks well separated and distinct in the majority of specimens; marginal border reddish above upper tail, olive-green to anal angle.

Underside. Generally less rufescent, more greyish than Malawi form 2; satiny areas in fore wing wider with a reduction of the rufous shading on the distal margin. The black lines on the basal half of the wing more clear but the upper side pattern is only slightly reproduced below.

Tanzania, Newala, north of Ruvuma River.

GROUP 4.

Charaxes ethalion nyanzae ssp. n.

(Pl. 4, figs. 31–35, Pl. 5, figs. 42, 45–48, Map 1)

MALE. Fore wing length 31–32 mm.; shape, short and broad; outer border of fore wing hardly at all incurved. *Upperside.* Ground colour black, white fringe on edge rather conspicuous in side light; no blue spots on subcosta or an obscure one just beyond end of cell and a minute dot in subapex at subcosta and sometimes a trace of a second subapical spot, otherwise wing immaculate. Hind wing black, almost immaculate except for a trace of submarginal off-white spots in tail area; marginal border with obscured reddish above upper tail and trace of greenish to anal angle. Tails short, upper 4 mm, lower 4 mm. *Underside.* Drab grey-brown with a satiny quadrate mark in cell, a satiny bar through disc and on postdiscal area and upper part of apex, with intervening areas slightly darker brown. Basal black lines fine; postdiscal black line fairly distinct; tornal black spot and submarginal dark marks not strong. Hind wing ground colour as fore wing, black lines fine, disc with a slight satiny bar, postdiscal zigzag line of olive and maroon lunules finely outlined proximally in black, fairly strong in lower half; submarginal pale line faint; marginal border narrow, reddish above upper tail, then olive to anal angle with small black dots proximad.

Holotype male. S. W. UGANDA: Kikagati, Kagera River. In B.M.(N.H.).

REGION 1. KENYA, WEST OF THE RIFT, CHEPALUNGU-MARA AREA, EAST SIDE OF LAKE VICTORIA.

♀ *ethalion* pattern.

The only specimen now available for comment is a large one, fore wing length 38 mm. *Upperside.* Fore wing, discal bar strong but rather narrow in lower portion, the mark in 1b is separated from the streak in 1a, and rounded on its distal end so that the postdiscal spot in this area is free. Hind wing band not very broad, represented at the costa by an elongate free mark; the band widens over the area of the cell, then tapers to inner fold; a discal white bar is visible in the upper half but the band is suffused with blue in the lower portion. Submarginal line rather indistinct except at anal angle; marginal border reddish then olive and well developed.

This specimen resembles the *ethalion* pattern from the Kagera River in Region 2.

Lake Victoria, south and eastern side: Suna-Chepalungu-Sotik.

♀ *rosae* pattern

♀ form *howardi* van Someren & Jackson

Charaxes ethalion ♀ f. *howardi* van Someren & Jackson, 1952 : 260.

This unique form has the *rosae* pattern, but all marks including the fore wing curved band strong ochre-yellow ; hind wing band also ochre but paler toward the costa. (Pl. 4, figs. 32, 35).

It will be noted that in this group, not only is the female of the *ethalion* pattern wide-barred, but the form like *rosae* is also very wide-barred, as is also *howardi*, in which the pattern is ocheous in colour, not white.

Kenya, west of Rift, Chepalungu.

REGION 2. S. W. UGANDA, KAGERA RIVER AND AREA SOUTH.

♀ *ethalion* pattern.

A large form, fore wing length 37–41 mm. *Upperside.* Closely resembling some specimens from northern Malawi, but fore wing spots in discal line in 2 and 3 more rounded and entirely free ; mark in 1b quadrate, streak in 1a longer. Postdiscal spots bold, entirely free to 1b where the spot touches or merges into the discal mark. Base of fore wing with a strong greenish sheen in side light, the greenish blue extending to proximal ends of white marks in 1b and 1a. Hind wing discal patch widest over cell area, generally broad and reaching costa, the discal white bar visible but suffused over with bluish scales, especially over the lower portion. Submarginal linear marks distinct, whitish or bluish, but may be rather obscured in upper portion ; marginal border may be reddish above upper tail or suffused with greenish, greenish to anal angle. *Underside.* Ground colour ashy-grey-brown, rather darker rusty to distal portion of fore wing ; generally brownish on hind wing. Fore wing pattern of upperside not strongly represented, except on 1b. Hind wing discal patch suffused over and indistinct though apparent below costa. Black tornal mark fore wing variable in size and density.

Variation a. In one specimen there is a large white spot at base of 4 in fore wing ; otherwise similar to above.

Variation b. The discal mark in 1b is short so that the postdiscal spot in this area is quite free. The hind wing band is narrower than usual ; the submarginal line is obscured in the upper half ; the marginal border normal, reddish above upper tail, then olive to anal angle.

Males associated with females of this group do not exhibit any outstanding characters by which to distinguish them from nominate *ethalion* males. Fore wing length 31 mm., outer border slightly concave. Ground colour velvety black ; two obscure subapical blue spots and a trace of one beyond cell. Hind wing without submarginal dots ; border barely indicated, anal angle with double green spot. *Underside.* As in nominate race.

Kagera River, S. W. Uganda.

REGION 3. TANZANIA, EAST SIDE OF L. TANGANYIKA, KIGOMA AND KUNGWE AREAS.

♀ *ethalion* pattern.

A single specimen has the following characters : *Upperside.* Fore wing pattern bold, in the discal line the white mark in 3 is elongate, those in 1a–1b broad, suffused proximally with blue. There is an additional spot at base of 4 in postdiscal row which goes to 3 and is here contiguous with the discal spot in same area. In the hind wing the discal band is represented at the costa by a single quadrate mark, but the patch widens rapidly and is very broad in the cell area, the extension being basad ; the outer border is irregular, the whole is suffused with greenish blue scales but mostly on the inner border. Submarginal line a series of strong white marks; marginal border reddish and olive as usual.

The underside is unfortunately rather rubbed, the white pattern of upperside is well represented on both wings; the tornal spot of the fore wing is strong. (Pl. 4, figs. 34, 35.)

Eastern side Lake Tanganyika. Mpanda-Kungwe.

♀ *rosae* pattern.

A very interesting specimen of this form was taken at Kungwe. Its characters are: *Upperside.* Fore wing discal curved band very wide, the subcostal white scaling extending to and contiguous with the two white spots beyond the cell end, the costa above also white, the mark in 2 is extended distad and that in 1b only a little less, while the streak in 1a is extended proximad. The hind wing discal band, mostly white, extends up to the costa, uniformly wide though irregularly dentate and sharply defined in mid area, then tapers gradually to above anal angle where it crosses the inner fold. Submarginal white linear marks well developed; marginal border strongly marked reddish and green. *Underside.* Ground colour pale greyish brown, the pattern of upperside well represented; basal black marks strong, especially in sub-base in 1b; tornal black spot fore wing large, rounded and strong. (Pl. 4, fig. 31.)

Lake Tanganyika, east side Kungwe.

REGION 4. E. KATANGA, LAKE MWERU AREA.

♀ *ethalion* pattern.

A single specimen from near Lake Mweru seems to belong to this group. It exhibits interesting features: the upper discal and postdiscal spots are large and there is an extra spot at base of 4; the lower discal marks form a triangle, very broad at base and conjoined up to 3 in a solid block, the postdiscal spot in 1b part of the block. The hind wing band is comparatively wide, commencing at the costa and merging into the inner fold, mainly white with only a slight tinge of blue on the borders. Fore wing length 35 mm. The specimen is unfortunately very worn.

Lake Mweru, Katanga-Zambian Border.

A small series recently received from Major Iain Grahame, from the Kigoma area of Tanzania are illustrated on pl. 5, figs. 42, 45–48. The specimens are large and some of the *ethalion* and *rosae* ♀ forms are decidedly creamy in their light markings, thus showing a tendency toward the ♀ form *howardi*.

Note however that no example of the *rosae* pattern has so far been recorded from the region of the Kagera River in S.W. Uganda.

GROUP 5

Charaxes ethalion littoralis **ssp. n.**

(Pl. 4, figs. 37–39, Map 1)

MALE. Fore wing 33–34 mm.; shape short, broad, outer margin fore wing very slightly concave at 2–3. *Upperside.* Fore wing, ground colour deep velvety black, almost immaculate but for a subcostal blue spot subapex and a trace of one in space below and sometimes an indication of a spot beyond end of cell; fringe white, broken by dark veins. Hind wing velvety black, greyer on inner fold. Submarginal spots very obscured, bluish in region of tails; border obscured, very faintly reddish above upper tail, dully greenish to anal angle. *Underside.* Drab greyish brown, strongly satiny with a large quadrate darker brownish mark in subapex, followed by diffuse brownish marks in postdiscal row, submargin with row of dark contiguous marks, but tornal mark not accentuated. Black lines distinct but fine. Hind wing ground colour as fore wing, with a satiny bar in the discal line, bordered by a darker zone carrying the zigzag series of olive and maroon lunules outlined in black proximally; submarginal row of greyish lilac marks triangular in region of tails, accentuated with black distally; marginal border maroon to upper tail, then olive to anal angle. Black lines in base of wing very thin. Tails short, upper 4 mm., lower 5 mm.

The above description is based on specimens from Shimba Hills. Examples from Amani, Usambara, are slightly larger, slightly more incurved on outer margin of fore wing, with the apex thus more pointed. The fore wing may be immaculate or with only one large blue spot beyond end of cell. Hind wing as in Shimba examples; tails of about equal length, 5 mm. Males from the savanna bush country of Kibwezi-Voi-Taveta are smaller.

Holotype male. KENYA: Shimba Hills, Kwale Dist., x. 1960 (*van Someren*). In B.M.(N.H.).

REGION I. KENYA COAST BELT AND HINTERLAND TO TEITA HILLS, KILIMANJARO, DAR-ES-SALAAM, AMANI.

♀ *ethalion* pattern.

A large insect, fore wing length 40–41 mm., resembling somewhat the *ethalion*-like female of the Malawi series. *Upperside.* There is often a spot or an indication of one in the fore wing cell; there is usually a small white spot at base of 4. The discal marks are large, even larger than in the Malawi form, the mark in 3 is rounded or elongate and entirely free, but the other marks, increasing in size, are contiguous, longest at the streak in 1a on hind margin. The upper spots are white, but those in the lower portion are bluish white or strongly blue. The postdiscal spots are well developed and free to 2, then touching or merging with mark in 1b of discal row. The upper discal and postdiscal spots are rarely connected by rays. The hind wing discal patch is broad, as wide as or wider than the streak in fore wing 1a, at the costa, and in 6 but tapering toward anal angle and crossing the fold as a quadrate mark; a white discal bar is well marked but the patch is shaded on either border with strong blue. The submarginal line is obscured in the upper half though indicated by some white scaling, in the lower half violet, accentuated by black dots. Tails long, slender, 5–6 mm. long. *Underside.* Ground colour dark greyish with just a slight brownish tinge basad, and on the discal line but *not* with the silvery discal area seen in *Charaxes contrarius* Weymer, which this form resembles. Light spots and bars of upperside strongly represented, the postdiscal lunate marks on hind wing greenish and maroon, especially strongly marked in lower half of zigzag line.

♀ *rosae* pattern.

Form a. Size rather variable, fore wing length average 36 mm. *Upperside.* Very similar to *rosae* of nominate race but differing as follows: the curved white bar in fore wing tapers rapidly toward the costa but does not reach it; the two spots beyond the cell are elongate and entirely free; the postdiscal spots are elongate and extend as far as 3; at this point the discal marks are of equal width to the hind margin, the outer border dentate as the marks are angled on the outer ends. Hind wing band rather narrow, but goes through to the costa, and is mostly white with slight blue scaling along inner border. Submarginal linear marks hardly visible; marginal border normal. *Underside.* Ground colour pale drab greyish brown; the fore and hind wing patterns of above clearly indicated. Tornal black mark of fore wing small.

Form b. Fore wing curved bar narrower, of almost uniform width throughout; lower discal marks slightly blue on proximal ends, otherwise white; postdiscal smaller and rounder, reaching to 2 but here joined to discal mark by some white scaling. Only one spot beyond the cell end. Hind wing patch not reaching the costa, though here represented by a dull bluish mark ; band comparatively wide, dull blue all over with an indication of darker obscure marks in discal line ; submarginal white linear marks strong ; border as normal. *Underside.* Slightly more brownish than Form a, especially on hind wing. Fore wing white curved bar well represented but postdiscal spots obscured ; hind wing without indication of discal band, but postdiscal zigzag olive-red line strong. Tornal black spot on fore wing small.

In spite of intensive trapping in the coastal region of Kenya, no examples of form *swynnertoni* have ever been taken.

REGION 2. KIBWEZI-VOI-TAVETA BUSH COUNTRY.

♀ *ethalion* pattern.

Specimens from the dry thorn bush country are placed to the coastal race, though they are in fact a small ecological form. The fore wing length varies from 33–34 mm. They are characterized on the upperside by the more restricted discal marks in the fore wing, less developed postdiscal spots and usually narrower hind wing band, which is less brightly blue on the borders. The underside is less greyish and more shaded with light rufous. The upperside pattern of fore wing clearly reproduced, but the hind wing discal band tapers out toward the anal angle, seldom crossing the inner fold.

♀ *swynnertoni* pattern.

The only record of this form that I know, from the thorn-bush area is that mentioned and figured by Rothschild & Jordan, 1900, (pl. 12, fig. 6.)

Other forms in this region are f. nr *ethalion* and f. nr *rosae.*

REGION 3. COAST REGION OF TANZANIA, DAR-ES-SALAAM, USAMBARA (AMANI) INLAND : MOROGORO, ARUSHA.

♀ *swynnertoni* pattern.

Specimens from this intermediate area are somewhat like those from Newala (Group 3, Region 3), but are larger. *Upperside.* The discal bar of the fore wing generally wider, the upper marks white, while the lower are bluish, or all marks may be blue ; marks in 1a–1b are expanded in both directions. The postdiscal series of spots are white in the upper half, blue in the lower, with the double spot in 1b free or contiguous with the discal spot. Hind wing patch slightly narrower than the Newala specimens, but variable ; marginal and submarginal lines similar. *Underside.* Ground colour more rufescent drab, the pattern of upperside obscured as a rule, but two specimens from Dar-es-Salaam exhibit this pattern clearly.

These Tanzanian specimens do not really belong to the Kenya Coast aggregate but are in fact a cline toward the Malawi group, but material from the intervening country is not available for study.

GROUP 6

Charaxes ethalion kikuyuensis ssp. n.

(Pl. 4, fig. 36)

MALE. Fore wing length 32–33 mm. ; shape short and broad. Fore wing outer margin almost straight or very slightly incurved in 3. *Upperside.* Ground colour velvety black ;

fore wing immaculate or with one subapical subcostal spot ; marginal white fringe very distinct in side view. Hind wing ground colour black, immaculate except for submarginal row of lilac, white centred spots, faint in upper part but very distinct in region of tails and double at anal angle. Marginal border narrow but distinct, reddish above upper tail, then olive to anal angle. *Underside.* Generally dark brownish, relieved by a slight satiny bar in discal line and in postdiscal zone to upper part of apex, bordered internally by fine black line expanding in 1b, and externally by a submarginal line of dark spots terminating in the large black tornal spot. Hind wing ground colour as fore, with a suggestion of a satiny discal bar ; the postdiscal zigzag line of olive and maroon lunules, accentuated in black proximally, very distinct from costa to above anal angle, where there is a pale quadrate mark above on inner fold and a black mark below ; submarginal pale line accentuated in black distally complete and clear ; marginal border reddish above upper tail, olive to anal angle.

Holotype male. KENYA : Nairobi district, Karura Forest, iii. 1949 (*E. Pinhey*). In B.M.(N.H.).

Range : Kenya Highlands, Nairobi, Meru, Mt. Kenya, Njombeni.

♀ *ethalion* pattern.

Slightly larger than the savanna form, fore wing length 35–37 mm. *Upperside.* Rather variable, specially in regard to the hind wing patch. Fore wing discal and postdiscal spots white and well developed ; a small spot often present at base of 4 ; discal spots in 2–3 well separated, but marks on 1b–1a increasingly large, the streak in 1a often extending proximad so that the inner border of the discal bar is concave. The postdiscal spots are entirely free up to 1b, though the spot here may merge with the discal mark. Hind wing discal patch wide, extending through to the costa, widening slightly in the cell area and tapering gradually to the inner fold, which is crossed above the anal angle. This patch is often pure white or with just a slight bluish tinge on its borders. Submarginal linear marks white and well developed ; marginal border dull red and olive, strong. Tails slender, upper one slightly spatulate at end, lower pointed, 7–6 mm. long. *Underside.* Greyish brown, slightly more rusty on hind wing ; light markings of upperside strongly represented, those of hind wing divided into discal and postdiscal bars ; submarginal whitish line strong, accentuated in region of tails by black marks.

Variation a. Differs only in that the discal bar in 1b is less wide, so that the postdiscal spot in this area is free. The hind wing band is narrower and more bluish on borders, so that the oblique white discal zone is clearly visible.

Variation b. Slightly larger, with fore wing discal and postdiscal spots connected by diffuse rays. Hind wing band narrow from costa to cell area, shaded blue only on the proximal side where it reaches the inner fold.

♀ *swynnertoni* pattern.

The *swynnertoni*-like form occurs sparingly in the Nairobi area and upper Kikuyu and Meru, but does not appear to go west of the Rift Valley.

Upperside. Ground colour black, slightly brownish at base of fore wing, which has a slight blue sheen in side light. Fore wing blue discal spots comparatively large in upper half, though second spot beyond the cell may be vestigial ; spots in 3–2 large and free, the spot in 1b not much larger, may be free or fused with longer mark in 1a, the lower part of the discal bar is thus not expanded to any extent. The postdiscal spots are whitish in the subapex, the rest bluish, the double spot in 1b is free. Hind wing patch not reaching to the costa as a rule, but there may be a diffuse subcostal mark in the discal line ; the patch is relatively wide, whitish in the disc but strongly violet-bluish on the borders. Submarginal linear marks whitish or mauve ; the marginal border as usual, reddish above upper tail then olive to anal angle. *Underside.*

Ground colour greyish brown, slightly stronger brown to outer margin of fore wing. The upperside pattern clearly indicated on the fore wing, tornal black spot well marked but discal band on hind wing less apparent, submarginal pale line strong ; marginal border clear.

♀ *rosae* pattern.

This form is represented in the Kenya Highlands by rather large specimens, fore wing length 38–40 mm. *Upperside.* Fore wing ground colour rather brownish at the base but blacker on distal half. The curved white band is uniformly wide, the costal and subcostal narrow white marks clear, the two marks beyond the end of the cell large and oval ; discal mark in 2 longest, with obliquely cut ends ; marks in 1b–1a of equal length, rectangular, 10 mm. wide. Postdiscal white spots clear, those in subapex very white, that in 3 rather obscured. Little or no blue scaling on lower discal marks. Hind wing discal band well developed and extending through to the costa by a rectangular mark ; the band widens in the cell area, then tapers toward the inner fold and crosses it above the anal angle ; band generally white with some bluish violet scaling on proximal border. Submarginal linear marks obscured and greenish ; marginal border well marked. *Underside.* Drab greyish brown on fore wing, browner on hind wing. The curved discal bar well represented below, but postdiscal marks obscured. Tornal black spots strong.

On the hind wing the discal band is moderately distinct. The postdiscal zigzag line not very strong. The submarginal line present but more strongly marked above in the region of the tails, accentuated distally by black spots and crescentic greenish marks above anal angle.

Marginal border reddish and olive as usual.

GROUP 7

***Charaxes ethalion marsabitensis* ssp. n.**

(Pl. 5, figs. 40, 41, 43, 44, Map 1)

MALE, Fore wing length 35 mm. outer margin slightly incurved. *Upperside.* Fore wing, ground colour velvety black, almost immaculate but for one minute dot subcostal beyond cell, and one or two subapical blue dots. Marginal white fringe conspicuous when viewed from side. Hind wing velvety black, dull black at inner fold. Submarginal row of lilac spots obscured in upper half but clear in region of tails ; marginal border dull red to between tails, then green to anal angle. Tails 5–6 mm. long, lower slightly up-curved, upper with reddish central line, lower slightly reddish or ochreous. *Underside.* Very similar to the Kenya Highland race *kikuyuensis*, brownish on fore wing with satiny patches beyond the cell and upper part of apex with darker brown patches between and on the border ; black lines in basal half of wing fine, postdiscal lines faint except for black mark in 1b, submarginal dark marks indistinct but strong in tornus. Hind wing ground colour more rusty brownish but with satiny flush in side light in discal line ; postdiscal zigzag line not bold except in region of tails ; submarginal linear lilac marks obscured in upper half, stronger at tails and accentuated with black angles. Marginal border red, including upper tail, then mixed red and olive to anal angle.

Holotype male. KENYA : Northern Frontier Province, at Mt. Marsabit, iii. 1946. In B.M.(N.H.).

Range : Mt. Marsabit, Northern Frontier Province, Kenya.

♀ *swynnertoni* pattern

FEMALE. The only female form taken in the Marsabit area, in spite of intensive collecting, has been of the *swynnertoni* pattern. Fore wing length in a majority of a long series, 42 mm. (a few smaller examples may occur in drought periods). *Upperside.* Fore wing, ground colour brownish black, slightly darker in the disc. Fresh specimens blacker. Discal and post-discal spots white, above area 1b large and bold ; discal spots in 2–3 rounded and usually free ; postdiscal spots in these areas angular, double spot in 1b free or may be slightly joined to discal mark by some violet-blue scaling, the mark in 1a–1b are widest and violet-blue in colour. Hind wing discal patch broad, carried up to the costa as two separate spots in discal and postdiscal lines, the intervening area blackish. The patch is generally suffused all over with violet-blue scaling but there is an indication of a paler central zone, especially toward the inner fold ; the outer border of the patch irregular. Submarginal linear mauvish white line, blackish edged distally, is strongly indicated ; marginal border, strongly reddish above upper tail or between tails, is olive to the anal angle. Tails long, upper one rounded at end, lower pointed, 10–9 mm. long, the upper tail with red central line, lower with pale ochre line. *Underside.* Ground colour greyish brown, greyer in the disc of fore wing but strong rufous on distal border ; the upperside pattern clearly indicated in discal line and upper part of postdiscal series. Hind wing generally suffused with rusty bloom, the discal band only slightly indicated ; submarginal line strongly marked ; marginal border strongly reddish then green to anal angle.

Biological note.

The following races of *Charaxes ethalion* have been bred :

ethalion ethalion, which lays on *Albizzia sassa* (*fastigiata* Oliv.) and *Albizzia charindensis* (teste Platt.) (Mimosaceae).

ethalion littoralis, which lays on *Parkia filicoidea, Albizzia adianthifolia, A. sassa,* A. *coriaria, Newtonia* (*Piptadenia*) *buchanani, Tamarindus indicus* (Mimosaceae), and *Scutia myrtina* (Rhamnaceae).

ethalion kikuyuensis, which lays on *Albizzia sassa, A. coriaria, A. gummifera* (Mimosaceae) and *Scutia myrtina* (Rhamnaceae).

SYSTEMATIC LIST

Charaxes ethalion Boisduval

With an indication of the female forms within Groups and Regions.

Group 1

Charaxes ethalion ethalion Boisduval, 1847. Type locality : " Natal ".

♀ f. *ethalion* Boisduval, 1847. Type locality : Natal.
et vars.

♀ f. *swynnertoni* Poulton, 1919. Type locality : Mt. Selinda, Rhodesia.
et vars.

♀ f. *rosae* Butler, 1845. Type locality : Natal.
et vars.

♀ f. *aurantimacula* forma n.

Range : From Durban area north to Beira, extending inland to Rhodesia.

Group 2

Charaxes ethalion pondoensis ssp. n. Type locality : Port St. Johns.

♀ *ethalion* pattern.

Range : Pondoland, Port St. Johns. Transkei, Bashee River, Embuyti Forest.

Group 3

Charaxes ethalion nyasana ssp. n. Type locality : Malawi and Nkata Bay.

♀ f. *ethalion* pattern = *nyasana* forma n.
♀ f. *swynnertoni* pattern.
♀ f. *cithaeronoides* forma n.
♀ f. *suppressa* forma n.
♀ f. *demaculata* forma n.
♀ f. *rosae* pattern *imitans* forma n.
et vars.
Region 1, Malawi.
Region 2, Zambia, western block.
Region 3, Tanzania, southern highlands and Ruvuma River area.

Group 4.

Charaxes ethalion nyanzae ssp. n. Type locality : S. W. Uganda, Kikagati and Kagera River.

Region 1, ♀ *ethalion* pattern.
♀ *rosae pattern* = *howardi* van Someren & Jackson. Kenya, west of Rift, Chepalungu-Mara area, east side Lake Victoria.

Region 2, ♀ *ethalion* pattern.
Uganda, S. W. Kagera River and area south.

Region 3, ♀ *ethalion* pattern.
♀ *rosae* pattern.
Tanzania : eastern side L. Tanganyika, Kigoma and Kungwe areas.

Region 4, ♀ *ethalion* pattern.
E. Katanga, Lake Mweru area.

Range : S. W. Uganda, Kagera River ; Kenya, E. side L. Victoria ; Tanzania, Kigoma, Kungwe.

Group 5

Charaxes ethalion littoralis ssp. n. Type locality : Shimba Hills.

Region 1, ♀ *ethalion* pattern, et vars. *ethalionoides* Carpenter.
♀ *rosae* pattern, et vars.
Kenya Coast belt and adjacent hinterland ; Tanga and ? Zanzibar.

Region 2. ♀ *ethalion* pattern.
♀ *rosae* pattern.
♀ *swynnertoni* pattern.
Kenya, Dry bush country : Voi, Kibwezi and southern Ukambani.

Intergrading cline between Groups 3 and 5

♀: *ethalion* pattern, *swynnertoni* pattern and *rosae* pattern.
The area embracing the central Tanzania Highlands, Morogoro, Dodoma; north to Usambara, western Kilimanjaro, Mt. Meru and Arusha.

Group 6

Charaxes ethalion kikuyuensis ssp. n. Type locality: Nairobi.

♀ *ethalion* pattern, *swynnertoni* pattern and *rosae* pattern.
Range: Kenya Highlands east of the Rift: Ngong, Nairobi, Kikuyu, to Nyeri and Meru Mt. Kenya.

Group 7

Charaxes ethalion marsabitensis ssp. n. Type locality: Mt. Marsabit.

♀, *swynnertoni* pattern only.
Range: Mt. Marsabit, Northern Frontier district Kenya.

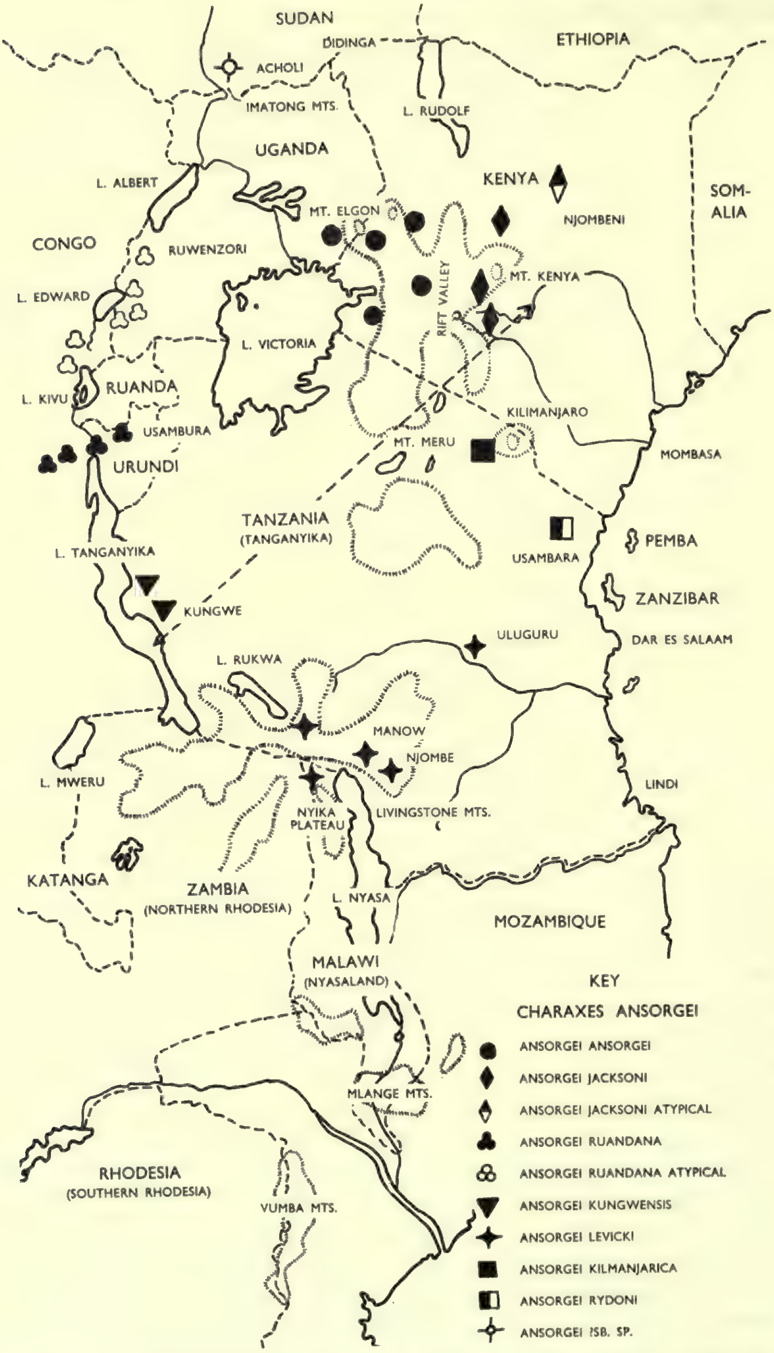
CHARAXES ANSORGEI ROTHSCHILD, AND ITS SUBSPECIES

The species *Charaxes ansorgei* can be divided into two groups, based on the character of the hind wing band: (a) a northern group in which this band is entirely white with slight blue scaling, and (b) a southern group in which the band is divided into two sections, tawny orange in the upper half and bluish white in the lower.

The species appears to have a somewhat restricted distribution (Maps 2, 3) and is found on the high ground in the regions of the Eastern Rift and the Western Rift in Eastern Africa. It is limited to montane evergreen forest at elevations of 6000–9000 feet and is closely associated with its food plant *Bersama abyssinica* et ssp. (Melanthaceae) which may occur in the forest, on the forest margins or as saplings and shoots from roots left in de-afforested land. Females may thus be noted outside the forest when ovipositing on these young plants, which they seem to prefer to the old trees.

Because of its restricted habitat, the species exhibits a strong tendency to split up into well defined localized races or subspecies, most of which are readily recognizable. Poulton (1933) reviewed the species and races known up to that time, and gave a very full comparative description of the subspecies and their respective distributions. One or two aggregates were however "left in the air" and undecided as to their relationship with adjoining defined races. *Vide* also Poulton (1932 : 6–9).

A large amount of additional material has come to hand of recent years, some from outside the range of the species as cited by Poulton and three new subspecies are described. I have also taken the opportunity to re-examine the doubtful specimens mentioned by Poulton in 1932.


SUDAN
DIDINGA
ETHIOPIA
ACHOLI
IMATONG MTS.
L. RUDOLF
UGANDA
KENYA
SOM-
ALIA
L. ALBERT
MT. ELGON
NJOMBENI
CONGO
RUWENZORI
MT. KENYA
RIFT VALLEY
L. EDWARD
L. VICTORIA
RUANDA
L. KIVU
KILIMANJARO
USAMBURA
MT. MERU
URUNDI
MOMBASA
TANZANIA
(TANGANYIKA)
PEMBA
USAMBARA
L. TANGANYIKA
ZANZIBAR
KUNGWE
ULUGURU
DAR ES SALAAM
L. RUKWA
MANOW
NJOMBE
L. MWERU
LINDI
NYIKA
PLATEAU
LIVINGSTONE MTS.
KATANGA
ZAMBIA
(NORTHERN RHODESIA)
L. NYASA
MOZAMBIQUE
MALAWI
(NYASALAND)
MLANGE MTS.
RHODESIA
(SOUTHERN RHODESIA)
VUMBA MTS.
KEY
CHARAXES ANSORGEI
● ANSORGEI ANSORGEI
◆ ANSORGEI JACKSONI
ANSORGEI JACKSONI ATYPICAL
♣ ANSORGEI RUANDANA
♧ ANSORGEI RUANDANA ATYPICAL
▼ ANSORGEI KUNGWENSIS
✦ ANSORGEI LEVICKI
■ ANSORGEI KILMANJARICA
◧ ANSORGEI RYDONI
⌖ ANSORGEI ?SB. SP.

Map 2. Distribution of *Charaxes ansorgei* Rothschild and subspecies.

There is still some doubt concerning the status of those aggregates which inhabit the forests of the several mountain ranges and more isolated volcanoes to the west and east of Lake Kivu and north west of Lake Tanganyika ; these are dealt with in the appropriate place.

Charaxes ansorgei ansorgei Rothschild

(Pl. 6, figs. 49, 53)

Charaxes ansorgei Rothschild, 1897 : 181.
Charaxes ansorgei Rothschild ; Rothschild & Jordan, 1898, pl. 5, f. 2.
Charaxes ansorgei ansorgei Rothschild ; Poulton, 1933 : 12.

MALE. Fore wing length 44 mm. (average), outer border slightly incurved at 2–4 ; margin bluntly dentate, hind wing margin serrate. *Upperside.* Ground colour fore wing base to discal line rufous, with some quadrate black marks, one in cell, one elongate transverse at end of cell, a mark at base of 4, triangular marks sub-basal in 3–2 and a black dot below in 1b, a quadrate mark beyond cell and a triangular black patch between the V formed by the discal and postdiscal orange spots ; the remaining discal and postdiscal orange marks fused together, but with an indication of black scales at line of fusion in 2 and 3 ; the lower part of the band in 1b 6–7 mm. wide. Border of wing black, with small orange spots on the margin, often double in 1b. Hind wing basal area more brownish, paling to greyish on the inner fold ; disc of wing crossed by a white band, narrow and white at costa, slightly constricted in 6, then widening over cell area and tapering to inner fold above anal angle, the borders of lower half suffused over with blue scaling. Border black, with orange admarginal spots most distinct above upper tail ; edge black with slight white fringe between dentate projections ; tails rather short, tapering quickly to a point, 4–3 mm. long ; anal angle with double bluish white to lilac dots. *Underside.* Pattern rather complex, the ground colour of the cell and bases of 2–7 chestnut, crossed by black lines heavily edged in silvery white ; the lower discal bar pinkish, shading to orange distally, with a series of black dots down the mid line to 2 ; a submarginal row of black spots increasing in size to tornus, those from 3 to subapex accentuated with white ; border of wing more greyish with small orange marginal spots with black between. Hind wing basal ground colour chestnut, crossed by an intricate pattern of black lines strongly outlined in white, bordered distally by irregular discal bar, widest at costa then tapering to 2 but extending through the inner fold above the anal angle as a triangular patch ; beyond the bar, the border of the wing is olive-brownish, with a series of black ocelli outlined in white, the ocelli at anal angle and in space above with lilac spots ; on the admargin a line of white and black linear marks, bordered by a marginal band of tawny-olive ; edge black with slight white line internally running into mid line of tails ; fringe slightly white.

FEMALE. Somewhat male-like but much larger, fore wing length 48 mm. *Upperside.* Base of fore wing slightly darker rufous chestnut ; the black marks similar, but the discal and postdiscal spots paler orange-ochre ; distal border of wing not so blackish, thus the marginal inter-nervular orange spots and white fringe slightly less distinct. Hind wing darker brownish at extreme base and brownish black on border ; the discal band rather narrow for size of insect, white at costa, more shaded with bluish on borders of lower half, especially in the cell ; border with orange admarginal spots duller and limited to the three or four above upper tail, those at upper angle distinct, the rest fading out ; a purplish spot at anal angle ; margin black, with white fringe especially strong at anal angle ; margin strongly serrate ; tails relatively short, 6–7 mm. *Underside.* General pattern as in the male but bolder, and distal borders of wings more olive.

The female lays on *Bersama abyssinica.* For full account of life history *vide* van Someren & Rogers, 1927–28.

Range : The nominate race of *Charaxes ansorgei* is confined to the high country west of the Rift Valley and is found in the outlying hills and forests of W. Mt. Elgon, on S. Elgon also on the east and in the higher riverine forests of the Trans Nzoia ; on the Nandi Hills, Lumbwa, Mau, Cherangani and Elgeyu. Specimens taken by Harrison, labelled " Nairobi " belong here.

Charaxes ansorgei jacksoni Poulton

(Pl. 6, figs. 50, 54, Map 2)

Charaxes ansorgei Rothschild ; Butler, 1900 : 915.
Charaxes ansorgei Rothschild ; van Someren & Rogers, 1928 : 31–32, 153–156.
Charaxes ansorgei jacksoni Poulton, 1933 : 13.

MALE. Fore wing length 38–40 mm. ; shape as nominate race. *Upperside.* Ground colour fore wing slightly darker rufous chestnut, shading into the black marks which extend to 1b on the proximal side of the discal bar, this bar narrower than in nominate *ansorgei* ; the postdiscal spots darker than the discal and the dark spots indicating the line of junction of the two series more apparent ; the bar not more than 4 mm. wide at 1b, the distal black border thus slightly wider from tornus to 3. Marginal orange spots slightly stronger than in *ansorgei ansorgei*. Hind wing ground colour as in nominate race, the discal white patch, though narrow at costa, widens out more basad over cell area and is slightly tinged with blue ; the admarginal orange spots are bolder and often extend from upper angle to a point mid way between the tails ; the serrate margin is black with distinct white fringe ; the tails longer, 7–5 mm. *Underside.* Much as in nominate race but the chestnut areas of fore wing rather larger, as also are the black bars in bases of 1b-3 ; the pinkish ochreous discal band, shading into the postdiscal line, is narrower in 1a–2, the intervening dark spots reaching to 1b ; the submarginal black dots with the distal lunate white stronger and extending to the tornal black spots. Hind wing shows less difference, but the postdiscal black and white ocelli larger and more conspicuous in the olive border of the wing ; the marginal orange-olive border more defined.

FEMALE. Fore wing length 47–48 mm. *Upperside.* Ground colour darker rufous chestnut at base than in nominate *ansorgei*, so that the black spots show up less, but the spots of the discal series are white, slightly ochre tinged from 2 to subcosta, the spot in 4 is set well in and there are two tawny streaks between it and the costa ; the postdiscal spots are tawny-orange, distinct in the subapex and less strong to 3, so that the whole wing bar is narrow, 6 mm. in 1b. Hind wing much as in the nominate race but the discal white patch is wider, extending more proximad over the cell area ; the admarginal orange spots are strong from upper angle to upper tail, then obscured ; a blue and green mark present at the anal angle. Margin black, with white fringe which outlines the strong serrations and the tails, which are 7–6 mm. long. *Underside.* There is a similar difference on the underside of this race when compared with nominate *ansorgei*, as noted in the males. In the fore wing, the discal bar is whiter and narrower, in the hind wing the discal bar is narrower and whitish ; the postdiscal line of irregular ocelli is stronger and the ground colour is tinged with chestnut ; the marginal border stronger greenish orange, then olive green toward the tails, this colour running down the mid line of the tails, which are black bordered with white.

Range : This subspecies is found east of the Rift Valley in the high forests on the eastern side of the Aberdare Mountains and also at the south end in the upper Kikuyu country at Uplands and the Kirita forest on the Katamayu River.

A slightly differentiated aggregate is found on the eastern side of Mt. Kenya in the upper Meru forests and also on the Njombeni Range to the north east of Mt. Kenya. Too few examples are available for study to judge the constancy of the characters, which are : female, fore wing length 50 mm. ; discal band entirely white and wider ; hind wing discal patch larger. Ground colour darker. Poulton (1932 : 800) records a female taken by Maj. Moysey on the high country between the Imatong and Acholi Hills in Southern Sudan, which may belong to a distinct race.

Charaxes ansorgei ruandana Talbot

(Pl. 6, figs. 51, 52, 55, 56, Map 2)

Charaxes ansorgei ruandana Talbot, 1938 : 289. [♀].
Charaxes ansorgei ruandana Talbot; Poulton, 1933 : [♂].

It is rather unfortunate that the name *ruandana* should have been selected by Talbot for this subspecies since the type locality is not within the country of Rwanda, but in Burundi ; it is also unfortunate that the type male should be one from further north-west, of Lake Tanganyika ; furthermore, the female figured by Poulton (1933, pl. 2, fig. 2) is one from the Congo-Uganda border. Poulton's quotation from LeCerf's communication indicates the differences to be found amongst the several aggregates of this very complex country. Although this area, taken as a whole, can be looked upon as an ecological entity within certain limits, the broken nature of the terrain due to mountain ranges and isolated ancient volcanic forested mountains, which originated during and after the period of rifting of the Western Rift, we find that certain montane species tend to break up into localized aggregates with no very decided characters to distinguish them. This is definitely so in the case of males of *ansorgei*, and the females are hardly at all known. However, until much more material becomes available, especially females, the subspecific name *ruandana* can be applied to the whole. I shall indicate the differences in the aggregates where possible.

MALE. a. (Topotypical, N.W. Lake Tanganyika, Grauer Coll., 5 specimens.) Fore wing length 37–38 mm. *Upperside.* Rufous chestnut at base of wing, darker than in nominate *ansorgei* and resembling more that of *jacksoni* ; pattern of black spots adjoining the discal pale bar heavier than nominate race but not so heavy as in *jacksoni* ; the upper discal-postdiscal orange spots forming the V clearer than in *jacksoni*, the conjoined spots from 3 to hind margin broader, but less broad than in nominate *ansorgei*, with the dark spots at line of fusion extending to 1b. Marginal spots smaller and paler. Hind wing discal white band very constricted at the upper end at costa at 6–7, the whole band narrower than in *jacksoni* ; admarginal orange spots small and rather indistinct. *Underside.* Fore wing pattern very similar to nominate race but bolder, the discal bar wider than in *jacksoni* ; distal border more olive and postdiscal ocelli bolder.

This agrees with type specimen figured by Poulton (1933, pl. 2, fig. 1).

b. (S.W. Uganda, Kigezi ; Ruhiza, Mafuga, Kanaba Gap). Compared with topotypical *ruandana*, the fore wing basal chestnut brighter, more rufous ; the discal-postdiscal orange bar wider at 1a–2 ; the hind wing discal white band wider and much less restricted at costal end ; admarginal orange spots stronger. Underside very similar to form (a) but hind wing white bar wider, especially at costal end.

c. (Mountains west of Lake Kivu). 3 specimens. Very similar to the S.W. Uganda form (b) in fore wing pattern ; hind wing white band as wide or wider at costal end. Underside similar.

FEMALE : a. No females are available.

b. (S.W. Uganda, Kigezi, Mafuga Forest.) Fore wing length 45–47 mm. *Upperside.* Base of wing chestnut ; black marks : one in upper part of cell, a line beyond end of cell, quadrate marks contiguous with the discal white spots from costa to 2 ; discal spots white or very slightly tinged ochre to 1b, streak in 1a white ; postdiscal spots : two upper ones white or slightly tinged ochre, a faint indication of other spot 3–2. Hind portion of band narrow, seldom more than 6 mm. wide at 1b. Distal portion of wing black ; marginal spots small. Hind wing brownish at base ; black border wide, admarginal spots obscured ; discal band slightly narrow at costa, then widening over disc and fading out in greyish inner fold, but narrower than in *jacksoni*. Cf. description of female and figure, Poulton (1933, pl. 2, figs. 2) from the Uganda–Congo border.

c. No females available from west of Lake Kivu.

The female lays on *Bersama abyssinica* var. Specimens were raised from larvae found on this plant at edge of Mafuga Forest, Kigezi, Uganda.

Range : Type female recorded from N.E. end Lake Tanganyika, 12 miles north of Usambura, (Urundi). Type male from N.W. Lake Tanganyika. Specimens placed to *ruandana* from forests west of Lake Kivu ; a long series from the high forests of Kigezi, S. W. Uganda : Mafuga, Ruhiza, Kanaba Gap. Also one specimen from Namwamba Valley, east side of Ruwenzori.

Ch. ansorgei ssp. nr. *ruandana* Poulton, 1933. Mention is made of a series of six males taken in the Kitembo area on the west side of Lake Kivu in 1931–32, at about 7–9,000 feet. The characters are : the fore wing band is much broader and more heavily marked with black than in *ruandana* ; the postdiscal spots rather larger and continued posteriorly as far back as area 1a ; the fore wing marginal spots more developed ; the hind wing band much broader and with no constriction toward costa. (Paris Museum).

Charaxes ansorgei kungwensis ssp. n.

(Pl. 8, figs. 65, 66, 69, 70, Map 2)

MALE. Fore wing length 40 mm. *Upperside.* Fore wing, general colour closely resembling nominate *ansorgei*, the basal areas of the wing being a bright rufous chestnut, but the black marks bolder, the discal and postdiscal orange spots paler, more orange ; the lower part of the discal bar wide, 7–8 mm. in 1b ; the marginal orange spots large and distinct. Hind wing, basal area brownish black, forming a rather strong angle with the greyish brown of the inner fold and accommodating the discal white patch, which has a rather strong black spot where the band is constricted below the costa, then widens out over the disc ; the band is almost as wide as in *jacksoni* ; and as in that race, the admarginal orange spots are large from upper angle to just above the upper tail, then more obscured to anal angle, which has a violet spot and a green admarginal line. Border as in other races ; tails short, sharply pointed, 3–4 mm. long. *Underside.* Basal chestnut of ground colour slightly more obvious, due to narrowing of black and white bars ; discal-postdiscal band wider and pinkish ochreous ; dark spots as in nominate race. Hind wing very like nominate, but fore part of discal bar wider and pinker.

FEMALE. Unfortunately, the only two females available for study are both rather battered but they are sufficiently good to show that the females of *kungwensis* differ from *ruandana* by having a considerably wider fore wing discal bar, the upper discal spots larger ; the two upper postdiscal spots are white, the remainder very obscured. On the hind wing the discal white bar is wider than in *ruandana*. The underside is too worn to show up details, but the most obvious character is the increased width of both fore and hind wing discal bands.

Holotype male. TANZANIA : East shore, Lake Tanganyika, in Mahali forest on the Kungwe Peninsula, vii. 1954 (*T. H. E. Jackson*). In B.M.(N.H.).

Allotype female. Same data as holotype.

A series of six males and two females, not considered paratypes.

Range : Tanzania, East shore, Lake Tanganyika, Mahali forest, Kungwe Peninsula.

Charaxes ansorgei levicki Poulton

(Pl. 7, figs. 60, 64, Map 2)

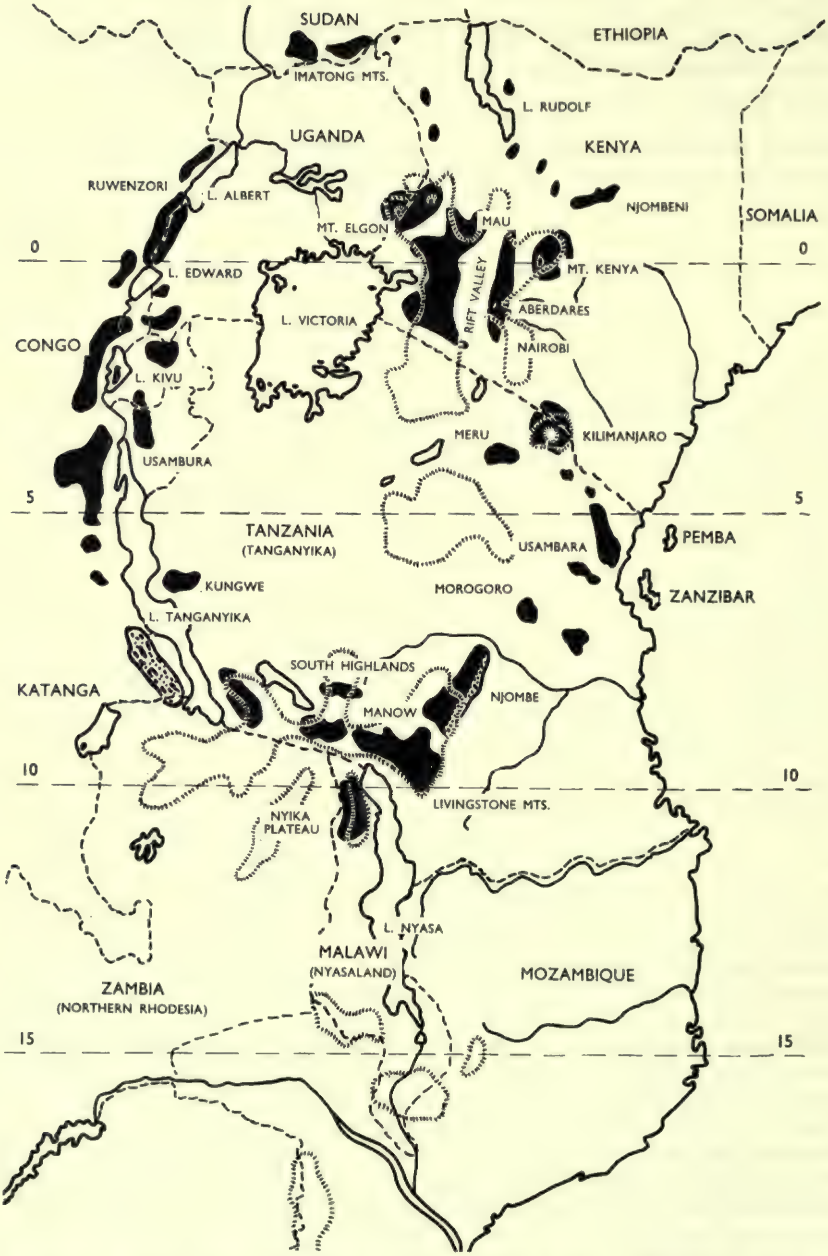
Charaxes ansorgei levicki Poulton, 1933 : 15.

MALE. Fore wing length 38–39 mm. *Upperside.* Fore wing, general tone of ground colour and pattern very similar to male of *ansorgei jacksoni*, the discal-postdiscal bar equally narrow ; the black marks more distinct, and the orange marginal spots stronger, almost quadrate in some examples. Hind wing basal area blacker, the discal bar almost divided into two blocks in form and colour : the two upper costal spots long ovoid, the next small, all orange, the rest of the band a long " droplet " with the apex toward the anal angle, pale bluish with a whitish bar crossing it obliquely ; admarginal orange spots large and distinct from upper angle to mid point between tails ; border black with very thin white fringe ; tails short, black, 4–5 mm. long. *Underside.* Fore wing, a basic pattern similar to other races but chestnut area strong in costal area ; the dark bars at basal area of wing, especially in 1b–2, broadly black ; the discal bar ochreous orange with a central pale line, the margin with orange and black spots. Hind wing discal band creamy with silvery sheen ; the border ground colour chestnut with the row of ocelli strong ; the margin reddish ochre, then more olive to anal angle ; marginal line white and black, the white going up the middle of the tails.

FEMALE. Fore wing length 45–47 mm. *Upperside.* Fore wing, ground colour at base dark chestnut, shading to almost blackish toward the discal line, with the usual black marks in cell and beyond ; upper discal spots are a streak in subcosta, followed by an elongate then quadrate spot, spot in 4 set well in, spots in 3 to hind margin increasing in size, the spot in 1b 6–7 mm. All spots in discal line yellowish ochre, slightly more whitish in 1a. Postdiscal spots in almost a straight line, those in 5–6 very slightly off-set, all spots bold and orange-ochreous in colour, spot in 2 may touch the lower point of discal mark. Border of wing deep brownish black ; margin with distinct though not large orange marks. Hind wing basal triangle black, shading to greyish brown on inner fold ; disc crossed by a wide cream-white band with slight greenish blue on inner border, greenish tinged on outer border. Border black, admarginal orange spots clear to upper tail, then more obscure to lower tail ; margin black with thin white fringe ; tails black, robust but tapering rapidly. *Underside.* Pattern basically similar to that of male, chestnut areas bold ; black marks in mid wing strong ; discal bar creamy white with ochre tinge proximally ; border of wing orange-olive with submarginal arrow-head marks strong. Hind wing boldly marked, the discal bar creamy ; the border of wing light chestnut to olive, with submarginal ocelli strong, that at anal angle and space above olive, black ringed ; border orange-olive, black edged and outlined in white proximally, fringe white.

This race has been bred in some numbers on *Bersama abyssinica* at Njombe, S. Tanzania Highlands, by Dr. C. H. McCleery.

Range : The Southern Highlands of Tanzania, the Rungwe and Poroto Mts. Manow, Njombe, and Iringa ; and on the Nyika Plateau in Malawi.


SUDAN
ETHIOPIA
IMATONG MTS.
L. RUDOLF
UGANDA
KENYA
RUWENZORI
L. ALBERT
NJOMBENI
MT. ELGON
MAU
SOMALIA
0
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L. EDWARD
MT. KENYA
RIFT VALLEY
L. VICTORIA
ABERDARES
CONGO
NAIROBI
L. KIVU
MERU
KILIMANJARO
USAMBURA
5
5
TANZANIA
(TANGANYIKA)
USAMBARA
PEMBA
KUNGWE
MOROGORO
ZANZIBAR
L. TANGANYIKA
SOUTH HIGHLANDS
KATANGA
NJOMBE
MANOW
10
10
LIVINGSTONE MTS.
NYIKA
PLATEAU
L. NYASA
MALAWI
(NYASALAND)
MOZAMBIQUE
ZAMBIA
(NORTHERN RHODESIA)
15
15

MAP. 3. Montane Forest areas, Eastern Africa (adapted from Vegetation Map, UNESCO, 1958), in relation to distribution of *Charaxes ansorgei* Rothschild and subspecies.

Charaxes ansorgei kilimanjarica ssp. n.

(Pl. 7, figs. 57, 58, 61, 62, Map 2)

MALE. Fore wing length 38 mm. *Upperside.* Fore wing, general colour and pattern very similar to *levicki* and as dark, the black marks proximal to the discal line slightly heavier ; the discal and postdiscal spots conjoined from 3–1b, the postdiscal series slightly darker rufescent than the discal ; border of wing black, with orange spots on margin well developed. Hind wing as in *levicki* but orange marks in upper part near costa more defined as three streaks, the lower part of band a long ovoid, bluer and smaller than in *levicki*. The admarginal orange spots large and extending to just above lower tail. Tails slightly longer and thinner, 5 mm. *Underside.* Basic pattern as in *levicki*, fore wing white lines more silvery ; the discal bar narrower. Hind wing white lines and the discal bar silvery ; submarginal marks bolder, the mark opposite the upper tail is a strong silvery rosette, ocelli below dark olive ringed in black, that at anal angle olive, ringed in black and with two blue dots.

FEMALE. Fore wing length 45 mm. *Upperside.* Fore wing, basal area slightly darker chestnut than *levicki*, thus black marks more obscured. Discal and postdiscal spots as in *levicki* but spots in 2–3 touch, all spots orange-tawny ; marginal spots small and may be partially obscured. Hind wing discal band narrower than *levicki*, first two marks at costal end square-cut on inner ends and forming a defined angle with the expanded patch over the disc, the costal marks ochreous, the rest white with a blue suffusion on the borders. Admarginal spots strong. Hind wing discal bar narrow ; the ground colour of the border lighter olive-chestnut ; the submarginal marks bold, the spot in 6 strongly silvery, that in 4 a silvery rosette outlined in black, the lower spots bold and olive, ringed in black, that at anal angle with two lilac spots ; border orange with olive tinge edged black and white as in the male.

Holotype male. TANZANIA: Western foot hills, 6–7000 ft., Kilimanjaro. ii. 1964 (*A. Brown & J. G. Williams*). In B.M.(N.H.).

Allotype female. Same data as holotype. In B.M.(N.H.).

Range : Known only from the western side of Mt. Kilimanjaro, Tanzania.

Charaxes ansorgei rydoni ssp. n.

(Pl. 7, figs. 59, 63, Map 2)

Two male specimens, unfortunately very damaged, were taken recently on the Usambara Range, Tanzania. They belong to the southern group of *ansorgei* in that the hind wing band is bicolored as in *levicki*. One specimen, though damaged, is reasonably fresh.

MALE. Fore wing length 40 mm. *Upperside.* Fore wing, colour brighter chestnut at base than in either *levicki* or *kilimanjarica*, more like *ruandana*, so that the black marks stand out strongly to 1b. The discal and postdiscal series of orange-tawny spots well developed, conjoined from 3 to hind margin 1b, the band relatively narrow, but wider than *kilimanjarica* and paler ; marginal spots very bold. Hind wing discal band in two sections, the upper part at costal end orange-tawny, the third mark not strongly defined, the bluish white portion of the band larger and paler than *kilimanjarica*, even larger than in *levicki* and extending basad in cell area ; marginal orange spots large and bold and extending to lower tail ; there is also a short blue line in the black border basad to the tails. *Underside.* Less dark than in either *levicki* or *kilimanjarica*, the chestnut basal areas paler and conspicuous, but the black marks of sub-base in 1b large and linked up with black mark sub-basad in 2 ; the discal bar comparatively narrow, mostly orange, slightly paler on proximal side ; marginal spots strong. On the hind wing the chestnut patches are conspicuous ; the discal bar narrow ; the submarginal irregular marks strong in the olive-chestnut ground, which fades to olive-ochre toward the anal angle ; the marginal border orange, then orange-olive to anal angle ; edge narrowly white and black.

Holotype male. TANZANIA : Usambara Range, Magamba Forest, nr. Lushoto, 8.x.1962 (*A. H. B. Rydon*). In B.M.(N.H.).

Female unknown.

Range : Known only from the higher forests of the Usambara Range, Tanzania.

SYSTEMATIC LIST

Charaxes ansorgei Rothschild

Charaxes ansorgei ansorgei Rothschild, 1897. Type male. Type locality, Patsho, Nandi ; in B.M. (N.H.). Type female. Type locality, Lumbwa, W. Mau in University Museum, Oxford.

Range : Uganda, W. & S.W. slopes of Mt. Elgon ; Bufumbo, Bulago, Butandiga, Mt. Kokamjero. N.W. Kenya, eastern slopes of Mt. Elgon, Trans Nzoia, Kitale, Turbo, Nandi forests, Lumbwa, Kericho, Mau, Elgeyo, Cherangani. All west of the Rift valley.

Charaxes ansorgei jacksoni Poulton, 1933. Type male. Type locality. Katamayo Riv. Uplands, Upper Kikuyu ; in University Museum, Oxford. Allotype female, Roromo, Kikuyu ; in B.M. (N.H.).

Range : Kenya, east of the Rift Valley, in high forest of the Kikuyu country : Uplands, Katamayo ; eastern Aberdares, Mweiga, Moyo.

Specimens from Mt. Kenya at Embu, Meru and Njombeni Range, slightly different.

Charaxes ansorgei ssp. (?) Poulton, 1932, records a female taken by Maj. Moysey on the high country between the Imatong and Acholi Hills in Southern Sudan.

Charaxes ansorgei ruandana Talbot, 1932. Type female. Type locality. 12 miles north of Usambura, north end of Lake Tanganyika, Kibera Forest, Burundi. In B.M. (N.H.).

Allotype male. Type locality. N. W. Lake Tanganyika. In B.M. (N.H.).

Range : (Nominate form) Mountains N.E. and N.W. of Lake Tanganyika. (Atypical form) : Mountains east of Lake Kivu ; Uganda : In Kigezi, S.W. : Mafuga, Kanaba Gap, Ruhiza ; Ruwenzori eastern side, Nawamba Valley. These are slightly different and agree with specimens from west side Lake Kivu, in Congo : Lushasha, 2·22°S, 38·51°E ; Bobandana, 1·42°S, 29°E. ; Katana, 50°S, 22·9°E.

Charaxes ansorgei kungwensis ssp. n.

Range : Tanzania: Mt. Kungwe, Mpanda district east side Lake Tanganyika. Types in B.M. (N.H.).

Charaxes ansorgei levicki Poulton, 1933. Type male. Type locality. N. Lake Nyasa (no exact loc.) Allotype female. Manow, north of Lake Nyasa in S. Tanzania, west of New Langenberg. In B.M. (N.H.)
Range : The southern Tanzania Highlands : Porto, Rungwe, Manow, Njombe and Owindi ; extending to the Nykka Plateau in N. Malawi.

Charaxes ansorgei kilimanjarica ssp. n.
Range : Known only from the western slopes of Mt. Kilimanjaro at Wasendo, 6000 ft. Types in B.M. (N.H.).

Charaxes ansorgei rydoni ssp. n. Kilimanjaro at Wasendo, 6000 ft. Type ♂.
Range : Tanzania, Usambara Range, high forests at Lushoto. In B.M. (N.H.).

CHARAXES POLLUX CRAMER AND ITS SUBSPECIES

This is a common species with an almost continuous distribution from the West Coast of Africa to Kenya on the east, extending southward on the western side to North Angola and Katanga, and on the eastern side to Mozambique and Rhodesia but not extending into Transvaal. (Map 4.)

It has been divided into two main aggregates, a northern group and an eastern group with some evidence of transitionals in the south-east of Katanga Province of the Congo and in Zambia. The subspecies will be discussed in detail hereafter.

It is mainly a forest species, but is also found in gallery forest and heavy woodland associated with its food plants, which in Eastern Africa are : *Bersama abyssinica* et ssp., (Melanthaceae), *Fluggea microcarpa* (Euphorbiaceae), *Deinbollia kilimanjarica* and *D. burbonica* (Sapindaceae). I cannot find any records of the species having been bred on the West Coast.

A full synonymy is given by Rothschild & Jordan (1898–1900) and need not be repeated here, but will be modified, as necessary, when dealing with the geographical races.

The manuscript name *euronotus* Le Cerf appears under the series of *Charaxes pollux* from Mozambique and Rhodesia, in both the British Museum (Natural History) and the Paris Museum and in the latter, one specimen bears a type label. Extensive search through relevant literature has failed to provide evidence that this name was ever published.

Charaxes pollux pollux Cramer

(Pl. 9, figs. 75, 76, 79, 80, Map 4)

Charaxes pollux Cramer, 1775 : 61.
Charaxes pollux Cramer ; Rothschild & Jordan, 1900 : 427.
Charaxes pollux pollux Cramer ; van Someren & Rogers, 1927–28 : 146–149. [Life history.]

MALE. Fore wing length 36–40 mm. ; *Upperside.* Fore wing, outer border very slightly concave at 3–4 ; basal area rufous tawny, followed by a broad, orange-tawny, disco-postdiscal band, broken in the upper half by black marks, one at upper angle of cell, a black quadrate spot at end of cell, sometimes joined to black mark basal in 3, a black mark beyond continuous with black mark in 4 and forming a triangle, a further triangular black mark separating the two arms of the V of orange marks of the upper part of disco-postdiscal band, which is slightly incurved at 3–4. Border broadly black, almost uniform in width, sometimes with very small tawny internervular spots on margin. Hind wing basal triangle rufous tawny, slightly paler toward costa, merging into tawny greyish on inner fold, the outer edge almost straight; discal band orange-tawny, paler at costal end, narrowing toward inner fold above anal angle; outer border almost straight, leaving a broad black border 10 mm. wide at 4–6, without any tawny spots on admargin; two bluish spots in anal angle often tinged violet; fringe narrowly white between veins; margin strongly serrate; tail moderately long 5–4 mm., sharply pointed. *Underside.* Basal half of fore wing rusty chestnut, with heavy black bars outlined in silvery white, the black bars in sub-bases of 1b–3 heavier and edged in white; the disco-postdiscal band whitish ochre, shading to orange distally; the postdiscal line with a series of black linear marks from subcosta to 2; border of wing tawny rufous with triangular black marks outlined in white to bluish in submarginal zone, blacker at tornus; border of wing more rusty with black marks at ends of veins. Hind wing, basal half up to discal bar deep chestnut, divided up into segments by silvery lines, the costal and subcostal ones double, the lines in the centre of the disc forming a somewhat diamond-shaped mark; black and white marks on inner fold form elongate triangles, with apices toward base of wing. Discal bar comparatively narrow, silvery white to buffish, clear cut on inner edge but more diffuse on outer, where it merges into the rusty tawny olive of the wide border; in the mid line of the latter there is a chestnut zone bordered in the postdiscal line by rather irregular black triangles edged with white; and in the submarginal line by linear black marks; anal angle with a large greyish ocellus outlined in black and with two lilac central spots; border rufous tawny shading to greenish olive on anal angle; edge black.

FEMALE. Fore wing length 45 mm., (average). Very similar to the male, but larger and usually paler. Shape as male. *Upperside.* Fore wing pattern like male, basal colour similar or slightly paler; black spots basad in 2–3 may be less strong. Black border wide, margin with very small tawny spots, usually complete. Hind wing pattern similar to that of male, but discal band may be paler; black border wide, without any yellow spots or just the slightest indication of a spot at upper angle.

Anal angle with or without blue spots. Margin serrate, with slight white fringe. Tails long, upper 8 mm., lower 5 mm. *Underside.* General pattern as in the male but lower portion of discal bar fore wing wider, and the series of linear black marks from costa to 2 in disco-postdiscal line stronger; the submarginal triangular spots stronger; the marginal border interrupted by black streaks through 5–6, the black marks shorter. Hind wing pattern as in the male but bolder; the postdiscal black and silvery marks stronger, especially that in 4, which is more silvery; submarginal lunate black marks strong; ocellus at anal angle very bold; admargin rusty brown with olive tinge, more olive toward anal angle; margin black with slight white fringe. In older specimens the chestnut bases and border tend to be paler and brighter.

Variation: a. Very similar to nominate form but subcostal and sub-basal black marks 3–4 of fore wing greatly reduced or obsolete. Sex not stated; but a female character. Var. *ongeus* Stoneham (1932 : 2).

b. A strongly marked colour variety in which the basal areas are darker than usual and the black borders more intense blue-black. Sex not stated. . . . Var. *bungense* Stoneham (1932 : 2)

Both are trivial variations.

c. Original description: "♂ Upperside: Fore wings with the whole of the black subcostal and discal spots fused together with the marginal border, so that rather more than the apical third of the wing is solidly black; all the yellow discal spots above vein 3 obliterated. *Underside*: The ground colour of the whole of the costal area of fore wings is white, without any trace whatever of the red patches of *pollux*; black spots normal, the post-discal spots between vein 3 and the costa more broadly bordered with silvery grey. Hind wings normal, but the white discal band a little broader than usual."

Sierra Leone. . . . ab. *subalbescens* Hall (1930 : 279).

Range: The nominate subspecies, with slight variations not related to environment, ranges from the West African countries of Guinea, Sierra Leone, Ghana, Nigeria, Cameroon, Gabon, Congo Republic, Central African Republic, Katanga and north Angola to parts of Zambia bordering on Katanga, thence to Rwanda, Burundi, Uganda and southern Sudan, to N.W. Kenya, Elgon, Mamdi, Sotik, Mau then across the Rift Valley to the Aberdares, Mt Kenya, Meru and Kikuyu to the Nairobi District.

Charaxes pollux geminus Rothschild

(Pl. 8, figs. 67, 68, 71, 72, Map 4)

Charaxes pollux geminus Rothschild in Rothschild & Jordan, 1900 : 497.
Charaxes pollux geminus Rothschild ; van Someren & Rogers, 1927–28 : 149.
Charaxes pollux zingense Stoneham, 1932 : 2, ***syn. n.***

Rothschild was in error when he referred to the specimens of *Charaxes pollux* Trimen (nec Cramer) as belonging to *geminus*. (See under *gazanus* ssp. n.)

The subspecies *geminus* Rothschild, is a mixed aggregate, as indicated in the original description. It consists of three forms which occur together, in greater or lesser degree, within the type area and throughout its distribution ; the forms are : (a) typical *geminus* (as type) ; (b) a transitional form and (c) which is very like nominate *pollux* but with narrow black borders to both wings.

MALES. a. Nominate *geminus* from Lauderdale, Malawi. Similar to nominate *pollux* in general appearance but upperside of fore wing disco-postdiscal band wider from 3 to hind margin and slightly paler, thus reducing the width of the black border, which has rather strong tawny spots on the margin ; hind wing discal band wider, the black border reduced in width in consequence ; the admargin with conspicuous orange tawny spots, distinct above upper tail, less so at tails, the spots well divided by black ; anal lobe with one blue spot. Tails rather thin and sharply pointed. Border of wing serrate. The underside exhibits a broader discal band ; the basal pattern of fore wing as in nominate *pollux* but arrow marks in submarginal border rather more distinct from sub apex to tornus. Hind wing pattern basically similar to nominate race but discal band very slightly wider ; the ground colour of the border slightly paler so that the postdiscal and submarginal dark marks show up more distinctly, the anal ocellus clear. (Pl. 8, figs. 67, 71, type.)

b. Topotypical : in this form the fore wing marginal tawny spots are as well developed as in the type *geminus*, but the hind wing admarginals are clear above upper tail but obscured to anal angle. Pl. 8, fig. 68.

c. Topotypical. Fore wing marginal spots minute, those of the hind wing admargin limited to one or two at upper angle ; black borders narrow. Pl. 8, figs. 72.

FEMALES. This sex exhibits variations similar to those in the males. Since all three forms are found in and around the type locality and throughout Malawi extending northward to Tanzania, the Kenya coastal belt and adjacent hinterland, the name *geminus* must apply to all forms within this aggregate. It should be noted however that the nominate *geminus* form is found almost to the exclusion of the others along the Kenya coastal belt and inland to the Teita Hills and the Taveta Forest, on the Usambara Range and on the foothills of East Kilimanjaro.

The name *zingense* Stoneham, proposed for specimens from the Kenya Coast just north of Mombasa is a synonym of nominate *geminus*.

Range : From Malawi and adjacent parts of Zambia east of the Loangwa Valley, north through southern Tanzania to Usambara, the coastal belt of Kenya and hinterland, Teita Hills, Taveta to East Kilimanjaro.

When this paper was in galley proof, a new subspecies of *C. pollux* was recognised. For its description, see Appendix, p. 316.

Charaxes pollux gazanus **ssp. n.**

(Pl. 9, figs. 73, 74, 77, 78, Map 4)

Charaxes pollux Trimen, 1894 : 41, nec Cramer, 1775.
Charaxes geminus Rothschild ; Pinhey, 1948 : 284.

When Trimen reported on the F.C. Selous collection of butterflies from Manicaland in 1894, he made the following observation : " A female from Christmas Pass and male from Mineni Valley . . . are both distinguished from West African examples . . . by possessing considerably larger ochre-yellow spots . . . on the margin of the fore wing . . . and a complete and conspicuous series of ochre-yellow lunules along the entire (*outer*) margin of the hind wings ; . . . they further both lack the . . . lowermost black spots between 2nd and 1st median nervules . . . " Trimen adds further that he believed these specimens to be the furthest south-east records of the species.

Rothschild (1900 : 497) quoted this reference as applicable to his subspecies *geminus* but he selected as the type of his new subspecies a specimen from Lauderdale, Malawi which belongs to a different ecological race, and he mentions other specimens from Zomba, also in Malawi. The low Zambesi Valley is the ecological barrier between the Malawi and the Manicaland-Gazaland aggregates.

MALE. Fore wing length 38–40 mm. but on an average smaller than the nominate *pollux*. *Upperside*. Fore wing, general pattern similar to other subspecies but basal and discal areas wider and paler, the disco-postdiscal band wider, the bars being fused up to area 6 ; the subcostal black areas reduced, the black spots in 3–2 reduced, often missing in 2 ; the marginal black border thus reduced in width and on its margin are conspicuous ochre-yellow spots complete from apex to tornus. Hind wing basal discal band paler and wider with a consequent reduction in the width of the black border which carries a conspicuous and complete row of admarginal ochre-yellow lunules almost contiguous and only narrowly separated by black veins. *Underside*. Fore wing generally paler than in other races, the white edging to the basal black lines slightly more conspicuous ; the disco-postdiscal band wider ; ground colour of border paler so that the submarginal dark arrow marks and the marginal internervular marks are more conspicuous. Hind wing generally paler, the discal pale band usually wider, and the marginal lunules more conspicuous. A few males may be more strongly orange-tawny at bases of wings, but the general paler pattern is maintained.

FEMALE. Fore wing length 43–45 mm. *Upperside*. Fore wing, pattern very similar to that of the male, exhibiting a general paleness compared with females of other races ; the disco-postdiscal band considerably wider and the black marks in 3–4 reduced in size ; the black border narrower but the marginal orange-ochre spots large. In the hind wing, there is a corresponding narrowing of the black border but the admarginal ochre-yellow lunules are large and very conspicuous and continuous to lower tail. *Underside*. This exhibits a corresponding paleness due to the increase in the width of the disco-postdiscal bands ; the hind wing with more conspicuous marginal lunules.

Holotype male. S. MOZAMBIQUE : Amatongas, v.1962 (*G. van Son*).

Allotype female. Same data as holotype. Types ♂, ♀ in Transvaal Museum.

Paratypes. Same data, in British Museum (Natural History) presented by Transvaal Museum. Other paratypes in the National Museums of Rhodesia, Bulawayo and in the National Museum (Coryndon Museum), Kenya, from Vumba Mountains.

Range : This southern race inhabits the area of Manicaland-Gazaland to Amatongas in S. Mozambique and extends to the Vumba Range to as far as Mt. Selinda, Rhodesia. It does not appear to go north of the Zambesi River nor south to the Transvaal.

SYSTEMIC LIST

Charaxes pollux Cramer

Charaxes pollux pollux Cramer, 1775, Type locality : " Guinea ".

Range : West Africa, Guinea, Sierra Leone, Ghana, Nigeria, Cameroon, Gabon, N. Angola ; Congo Republic and Katanga and adjacent area of Zambia west of the Loangwa Valley, Rwanda, Burundi, S. Sudan. Uganda to N.W. Kenya, Elgon, Nandi, Sotik and Mau then crosses the Rift Valley to the Aberdares, Kikuyu to Mt. Kenya and Meru and in the Nairobi district.

Charaxes pollux geminus Rothschild, 1900. Type locality : Lauderdale, Zomba, Malawi.

Range : Malawi and adjacent Zambia east of the Loangwa Valley ; southern and eastern Tanzania to Kenya coastal belt and hinterland to Teita and East Kilimanjaro.

Charaxes pollux maua ssp. n. Type locality : western foothills, Mt. Kilimanjaro, Maua. (See Appendix).

Range : western foothills, Mt. Kilimanjaro and Mt. Mweru.

Charaxes pollux gazanus ssp. n. Type locality : Amatongas.

Range : Southern Mozambique, Manicaland and Gazaland, eastern Rhodesia, Vumba Mts. to Mt. Selinda.

ACKNOWLEDGEMENTS

I am indebted to the following for assistance and the loan of essential material and record my thanks : The Keeper and Staff of the Entomological Department of the British Museum, (Natural History), particularly Mr. T. G. Howarth ; Mr. Ernest Taylor, Hope Department of Entomology, University Museum, Oxford ; Dr. G. van Son, Transvaal Museum, Pretoria ; Dr. Elliot Pinhey, National Museum of Rhodesia, Bulawayo, Rhodesia ; Dr. C. B. Cottrell, University College, Salisbury, Rhodesia ; Mr. K. M. Pennington, Balgowan, Natal ; Mr. J. D. Handman of Limbe, Malawi, whose contributions were of outstanding value ; Mrs. J. Wedekind, Mumbwa, Zambia ; Mr. D. C. Plowes, Umtali, Rhodesia ; Mr. Duke, Salisbury, Rhodesia ; Mr. J. Lawson, Durban Museum, Natal ; Mr. C. R. Barrett of Johannesburg ; Mr. W. Teare, Benoni, Transvaal ; Mr. C. McMaster of Stutterheim, South Africa ; Dr. C. McCleery, Njombe, Tanzania ; Mr. Ionides, Newala, Tanzania ; Dr. A. Rydon, Arusha, Tanzania; Major Iain Grahame, Jinja, Uganda; Mr. J. H. Bailey, Menengai, Kenya; Mr. Barton Eckett, Hoeys Bridge, Kenya; Mr. T. H. E. Jackson, Kitale, Kenya; Mr. R. H. Carcasson, National Museum (Coryndon Museum), Nairobi.

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Full details of references will be found in earlier parts of this issue.

VAN SOMEREN, V. G. L. 1963. Revisional Notes on African Charaxes (Lepidoptera : Nymphalidae). Part I. *Bull. Br. Mus. nat. Hist.* (Ent.) **13**(7) : 195–242, 19 pls, 5 text-figs.

—— 1964. Part II. Ibid., **15** (7) : 181–235, 23 pls, 4 maps.

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APPENDIX

Charaxes pollux maua ssp. n.

Specimens of *pollux* from the foothills of Western Kilimanjaro differ appreciably from *p. geminus* Rothschild of Malawi and the Tanzania coastal belt, the Kenya coast to the Teita Hills of the hinterland. Whilst retaining some of the characters of *geminus*, i.e. the orange spotting on the submargin of the hind wing, the West Kilimanjaro insects are generally darker above and below, in both sexes.

MALE. Fore wing length 39–40 mm. *Upperside*. Basal triangle rufous chestnut, darker than in *geminus* and in greater contrast to the orange disco-postdiscal bar; subcostal black marks bolder and stronger; the marginal black border wider from 4 to apex; marginal orange spots distinct. Hind wing basal area darker so that the subcostal portion of the discal band is noticeably creamy but stronger orange toward the inner fold above the anal angle; black border wider, with large orange spots 4–5 in number, decreasing in size from upper angle to upper tail. *Underside*. Pattern strong and darker than in *geminus*.

FEMALE. *Upperside*. follows the general darker tone and wider black border, noted in the male. *Underside* also darker and more boldly marked.

Holotype male. TANZANIA: western foothills, Mt. Kilimanjaro, Maua, ix. 1966 (African collector for Major Grahame).

Allotype female. Same data. Types will be deposited in B.M. (N.H.).

A long series of both sexes, taken over a period of three months in 1966 and throughout all months during previous years, exhibits a constancy in characteristics throughout the year.

Range: In the forested areas of the foothills of western Mt. Kilimanjaro and Mt. Meru, 6–9,000 ft. Arusha, Ngurdoto Crater, 1963 (*A. H. Rydon*); Maua Estate, West Kilimanjaro (*A. F. Brown*); Lyamungu Moshi, Marangu.

On map 4 the sign for *pollux geminus* west of Mt. Kilimanjaro refer to this new subspecies.

ETHIOPIA
SUDAN

PLATE 1

Charaxes ethalion Boisduval

Figs. 1 and 2. *ethalion* Boisd., ♂ (Portuguese East Africa) and ♀ (Vumba District, Bomponi), upper and undersides.

Fig. 3. *ethalion* ♀ form *rosae* Butler, ♀ (Rhodesia : Umtali), hind wing discal bar much reduced in upper half.

Figs. 4 and 7. *ethalion* ♀ form *rosae* Butler, Type ♀ (Natal), upper and underside. Photos B.M. (N.H.), Nos. 34015 and 34016.

Figs. 5 and 8, 6 and 9. *pondoensis* ssp. n., Holotype ♂ (Pondoland, Port St. Johns) and Allotype ♀ (Bashee River), Bridges leg., upper and undersides.

Approx. 2/3 natural size.

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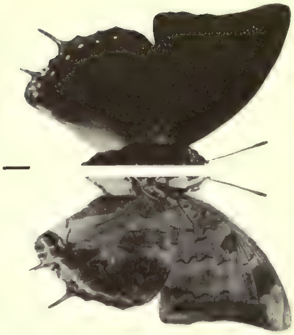

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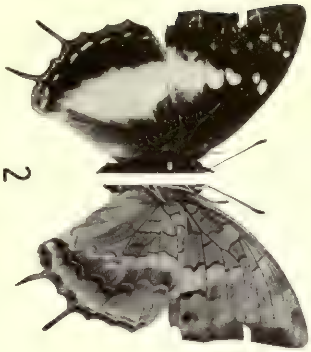

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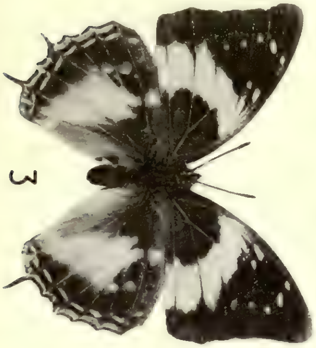

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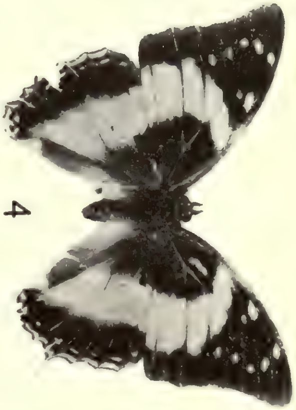

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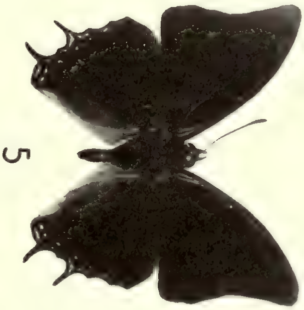

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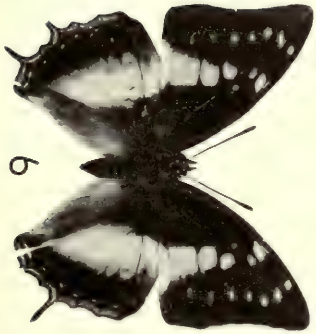

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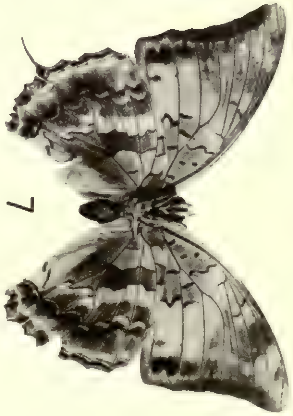

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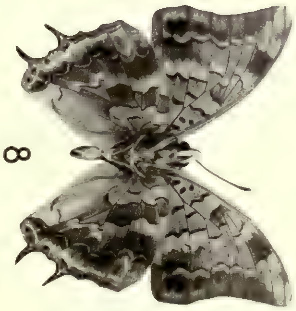

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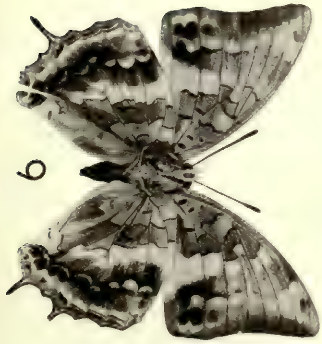


PLATE 2

Charaxes ethalion Boisduval

FIG. 10. *ethalion* ♀ form *swynnertoni* Poulton, ♀ (Portuguese East Africa : Amatongas), upper and underside.

FIGS. 11 and 12. *nyasana* ssp. n., Holotype ♂ (Lake Nyasa, Nkata Bay), Handman leg., upper and underside.

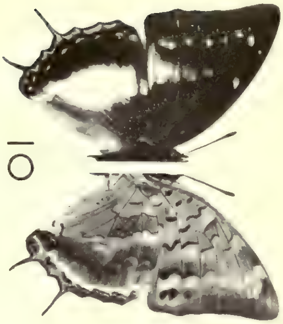
FIGS. 13 and 14. *nyasana* ♀ form *nyasana* forma n., Allotype ♀ (Malawi [Nyasaland] : Mlaye), fore wing spots white, no spot in cell or 4 of distal row ; hind wing bar narrower, strongly blue on lower portion, upper and underside.

FIG. 15. *nyasana* ssp. n., ♀ variety (Lake Nyasa, Nkata Bay), base of wings with green sheen ; spot in cell and base 4 ; all spots large and white ; hind wing discal band white extending proximad, upper and underside.

FIGS. 16 and 17. *nyasana* ♀ form *imitans* forma n., Type ♀ (Malawi [Nyasaland] : Mlaye, Mlosa stream), fore wing white bar wide at costa ; hind wing band strongly blue, upper and underside.

FIG. 18. *nyasana* ♀ form *imitans* forma n., ♀ (Malawi [Nyasaland] : Mlaye), hind wing band very narrow, not reaching costa ; strongly blue, upper and underside.

Approx. 2/3 natural size.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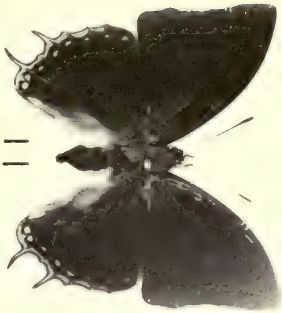
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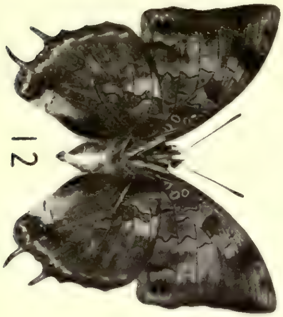
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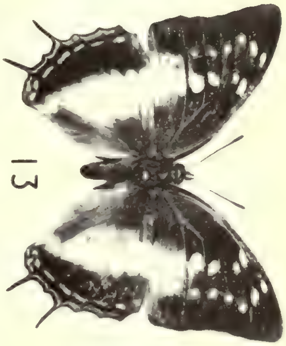
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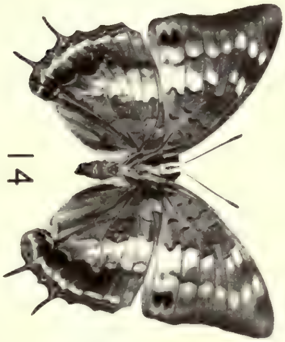
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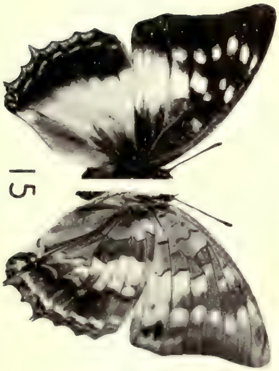
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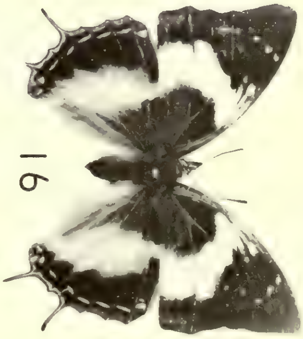
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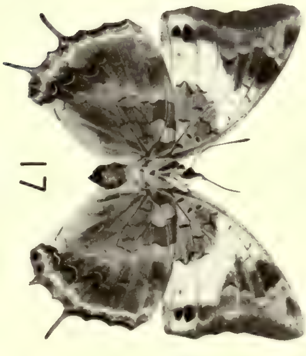
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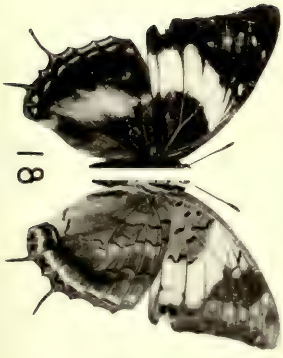
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PLATE 3

Charaxes ethalion nyasana ssp. n.

Figs. 19 and 22. Variety of ♀ form *imitans* forma n., (Mlanje, Chitakali), fore wing discal curved bar very narrow and broken ; spot beyond cell large, postdiscal spots, except in subapex, missing ; hind wing band reduced, strongly blue, upper and underside.

Figs. 20 and 23. ♀ form *suppressa* forma n., Holotype ♀ (Malawi [Nyasaland] ; Port Herald, Mlosa stream), fore wing discal bar almost entirely suppressed ; postdiscal spots strong and complete ; hind wing band strongly blue, upper and underside.

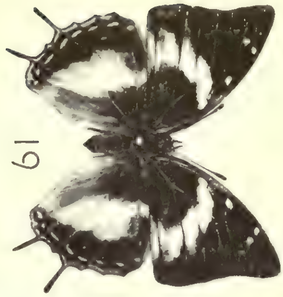
Figs. 21 and 24. ♀ form *demaculata* forma n., Holotype ♀ (Malawi [Nyasaland] : Lugeri stream), fore wing discal bar strong but postdiscal spots almost absent ; hind wing band goes to costa but is narrow, white in discal line, strongly blue on borders, upper and underside.

Figs. 25 and 28. ♀ form *cithaeronoides* approaching form *swynnertoni* (Malawi [Nyasaland] : Port Herald), fore wing spots large, mauvy blue ; hind wing band white with mauvy blue suffusion, upper and underside.

Figs. 26 and 29. ♀ form *cithaeronoides* forma n., Type ♀ (Malawi [Nyasaland] : Mlaye, Mlosi stream), fore wing spots greeny blue ; hind wing band strongly greeny blue upper and underside.

Figs. 27 and 30. ♀ form near *rosae* (Lake Nyasa, Monkey Bay), fore wing bar and spots beyond well developed ; hind wing band broad, reaching costa ; mostly white especially in disc, faintly blue on borders, underside strongly marked, upper and underside.

Approx. 2/3 natural size.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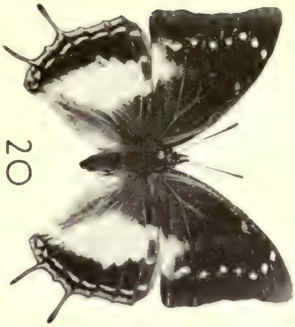
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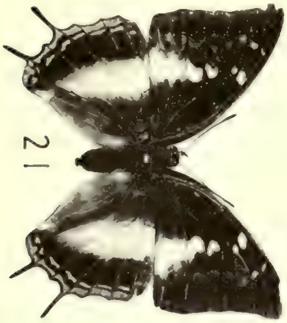
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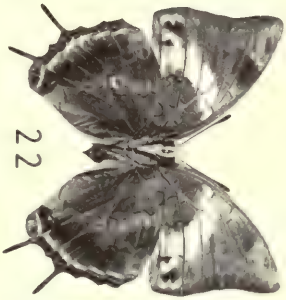
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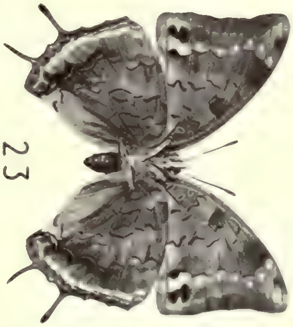
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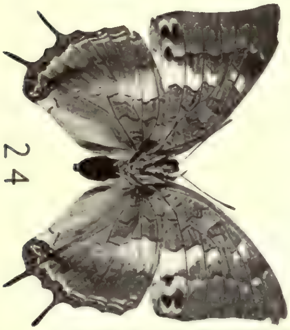
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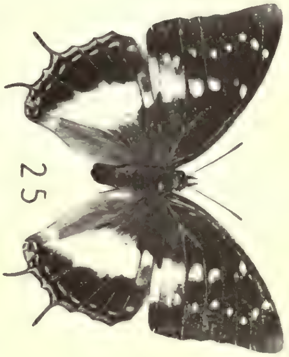
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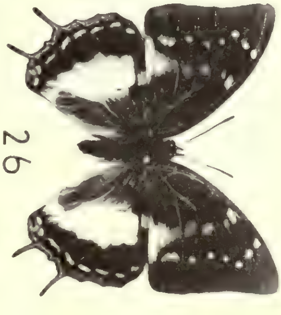
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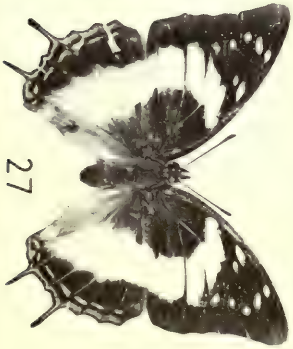
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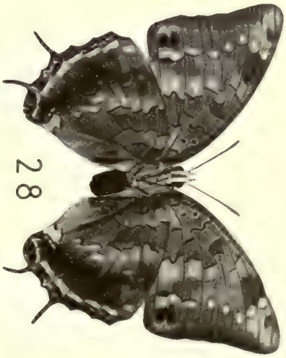
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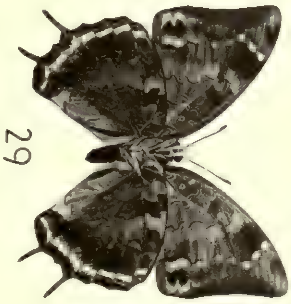
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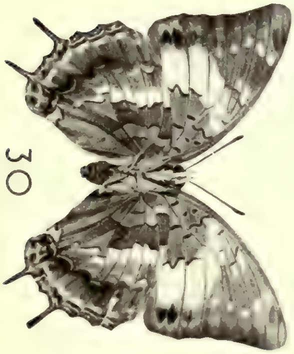
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PLATE 4

Charaxes ethalion Boisduval

Fig. 31. *nyanzae* ssp. n., ♀ *rosae* pattern (E. side Lake Tanganyika, Kungwe).

Figs. 32 and 33. *nyanzae* ♀ form *howardi* van Someren & Jackson, Type ♀ (Kenya : Chepalungu), *rosae* pattern but fore wing curved band very wide in lower portion, upper spots large ; all pale marks in fore and hind wings ochreous, upper and underside. Photos B.M. (N.H.), Nos. 35017 and 35018.

Figs. 34 and 35. *nyanzae* ssp. n., ♀ *ethalion* pattern (E. side of L. Tanganyika, Mpanda-Kungwe), fore wing discal spots large, an extra spot in 4 ; upper spots white, lower strongly blue ; hind wing band wide, narrowly white in discal line, strongly blue on borders, upper and underside.

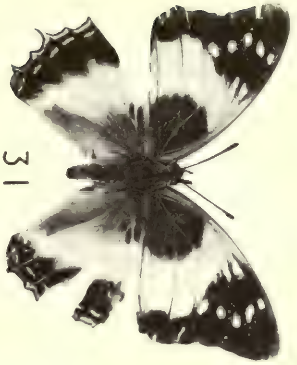
Fig. 36. *kikuyuensis* ssp. n., ♀ *ethalion* pattern (Kenya : Nairobi District), fore wing discal and postdiscal spots white, slightly bluish over 1a–1b ; hind wing band very broad, white in disc, borders slightly bluish, upper and underside.

Fig. 37. *littoralis* ssp. n., ♀ *ethalion* pattern (Kenya Coast : Sekoke-Arabuku forest), fore wing discal and postdiscal spots conjoined in posterior area, rayed in upper, spots large, discal bar wide ; hind wing band very broad even toward costa, white with pale blue on borders, upper and underside.

Fig. 38. *littoralis* ssp. n., ♀ (Kenya Coast : Shimba Hills, Kwale), fore wing discal bar narrow, no spot in cell or base 4, white with slight bluish on hind margin in 1a ; hind wing band going through to costa, rather narrow, white in disc, strongly blue on borders, upper and underside.

Fig. 39. *littoralis* ssp. n., ♀ (Tanzania [Tanganyika] : Usambara Range, Amani), fore wing discal bar reduced in width, postdiscal spots small but clear ; hind wing band white, extending to costa, strongly white in discal line, bluish on borders, upper and underside.

Approx. 2/3 natural size.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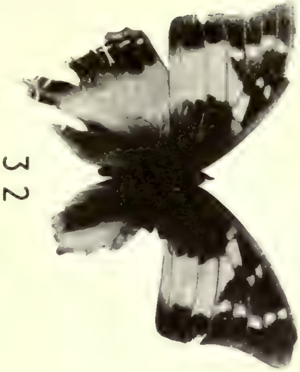
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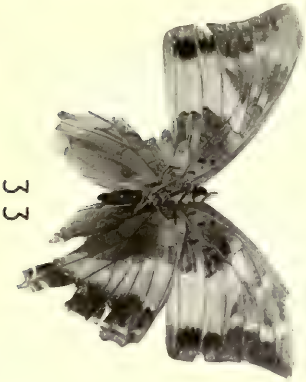
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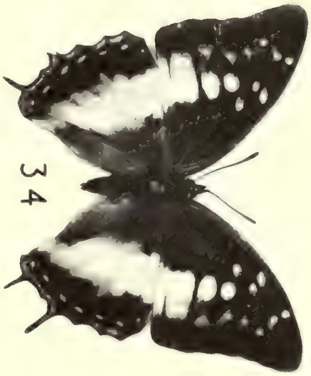
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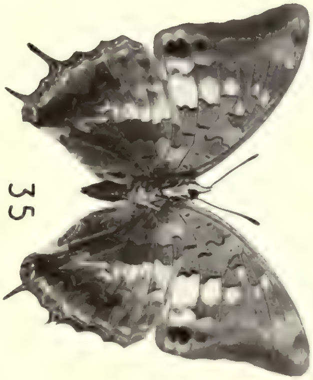
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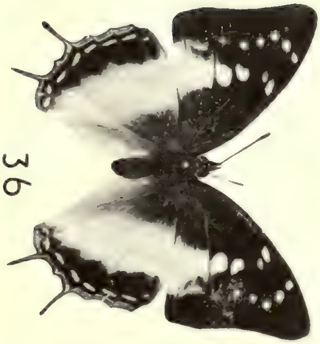
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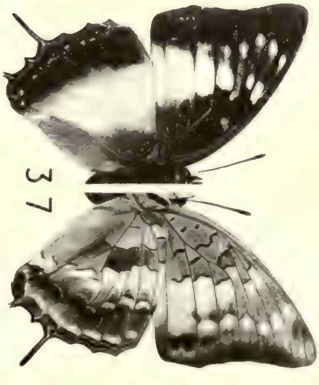
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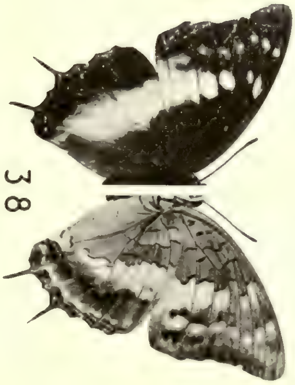
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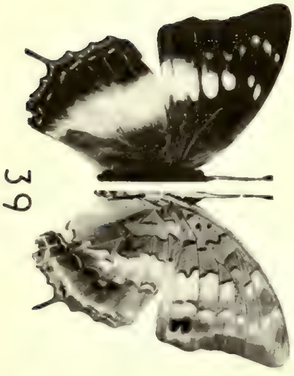
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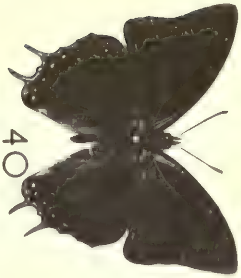
PLATE 5

Charaxes ethalion Boisduval

Figs. 40 and 43, 41 and 44. *marsabitensis* ssp. n., Holotype ♂ and Allotype ♀ (Kenya: Northern Frontier Province, Mt. Marsabit), fore wing of ♀ with upper discal and postdiscal spots white, though spots in 1a–1b are mauvy blue; hind wing band mauvy blue; submarginal linear marks strong, upper and underside.

Figs. 42 and 45–48. *nyanzae* ssp. n., ♂ and 4♀, (North-eastern side Lake Tanganyika, Kungwe and Kigoma region at Mukuyu), Group 4 Region 4; 45 and 46, ♀ *ethalion* pattern variety; 47, ♀ *swynnertoni* pattern; 48, ♀ *rosae* pattern; these ♀ forms are characterized by very bold, enlarged patterns. Cf. Plates 2 and 3, ♀ of *nyasana*, upper and undersides. Specimens in Coll. I. Grahame.

Approx. 2/3 natural size.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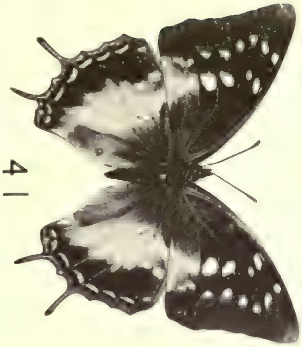
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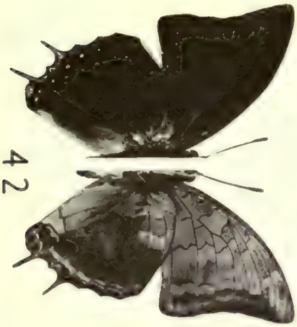
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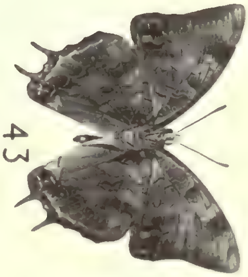
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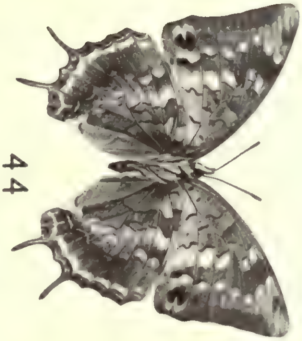
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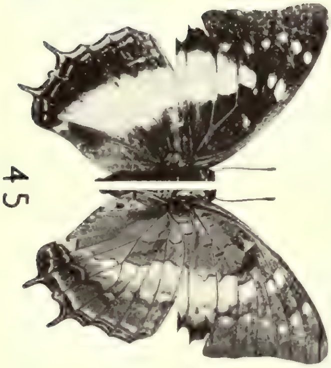
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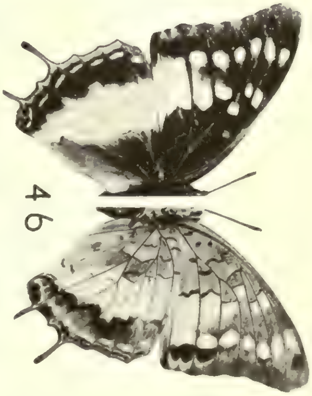
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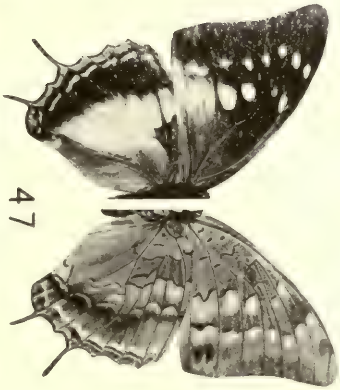
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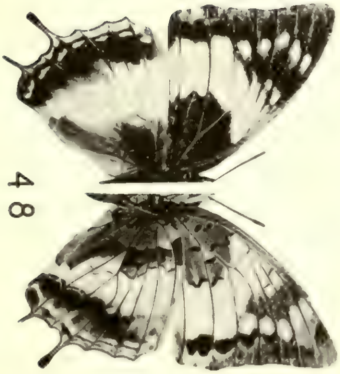
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PLATE 6

Charaxes ansorgei Rothschild

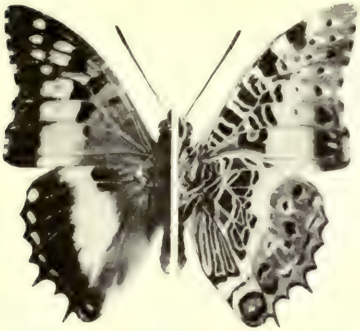
FIGS. 49 and 53. *ansorgei* Rothschild, ♂ and ♀ (topotypical Kenya: Mt. Elgon and Nandi Hills), upper and undersides.

FIGS. 50 and 54. *jacksoni* Poulton, ♂ and ♀ (topotypical Kenya: Upper Kikuyu, Katamayu forest), upper and undersides.

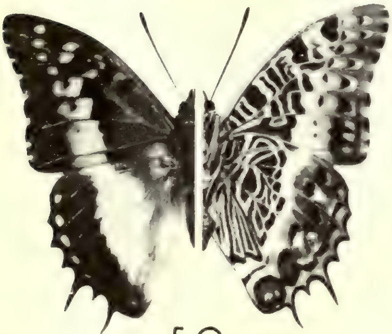
FIGS. 51 and 55. Near *ruandana* Talbot, ♂ and ♀, (Uganda: Rutenga District, Mafuga forest, Kigezi), upper and undersides.

FIGS. 52 and 56. *ruandana* Talbot, ♂ (topotypical N.W. of Lake Tanganyika), upper and underside.

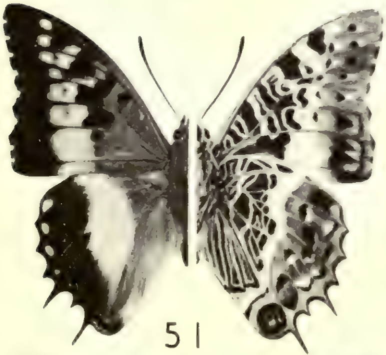
Approx. 2/3 natural size.



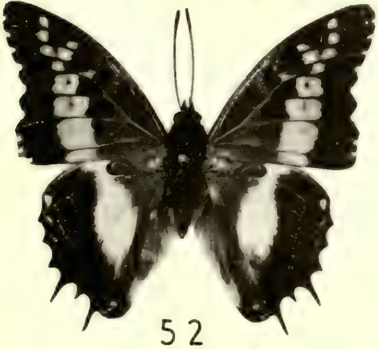
49



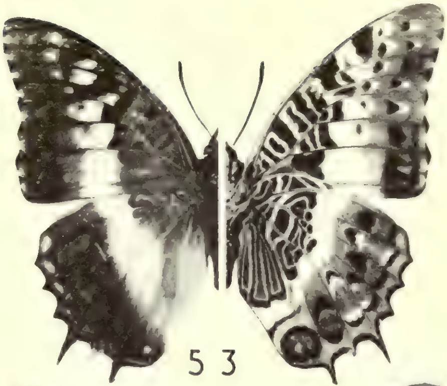
50



51



52



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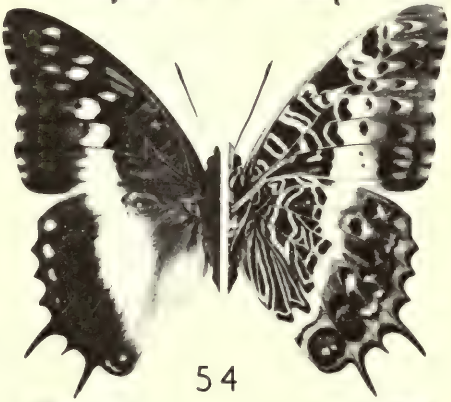
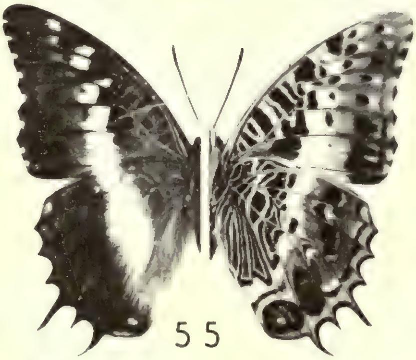


54



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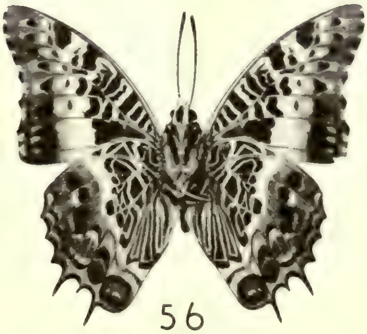


56

PLATE 7

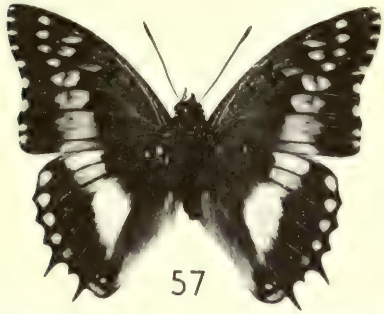
Charaxes ansorgei Rothschild

FIGS. 57 and 61, 58 and 62. *kilimanjarica* ssp. n., Type ♂ and Type ♀ (Tanzania [Tanganyika] : West Kilimanjaro, 6–7,000 ft.), A. Brown and J. G. Williams, upper and undersides. Types in B.M. (N.H.).

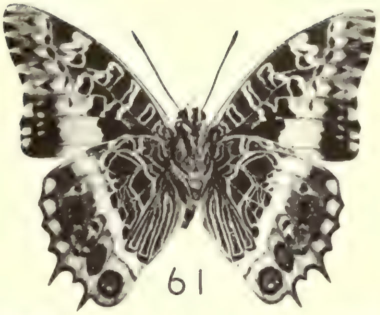
FIGS. 59 and 63, *rydoni* ssp. n., Type ♂ (Tanzania [Tanganyika] : Usambara Range, Magamba forest, Lushoto), A. Rydon leg., upper and underside . Type in B.M. (N.H.).

FIGS. 60 and 64, *levicki* Poulton, ♂ and ♀ (Tanzania [Tanganyika] : Southern Highlands, Njombe). C. H. McCleery leg., upper and undersides.

Approx. 2/3 natural size.



57



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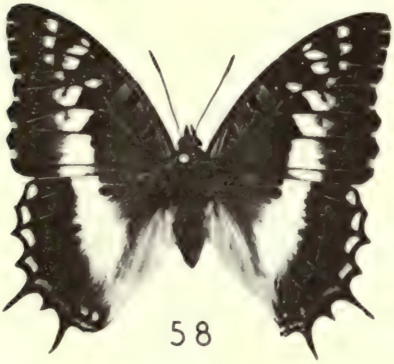
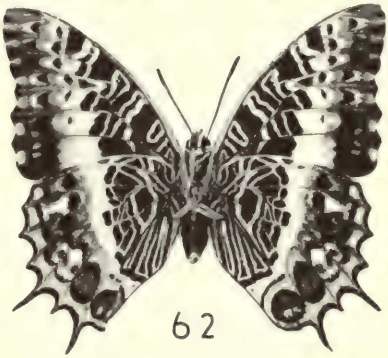
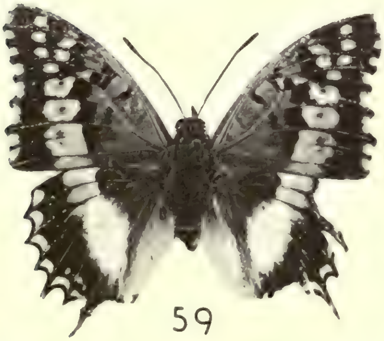


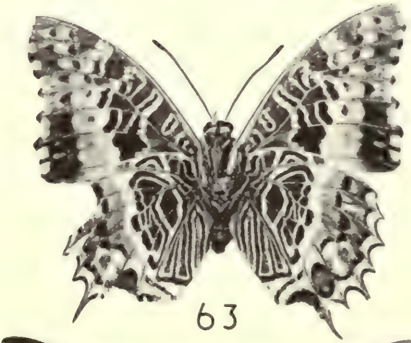
58



62



59



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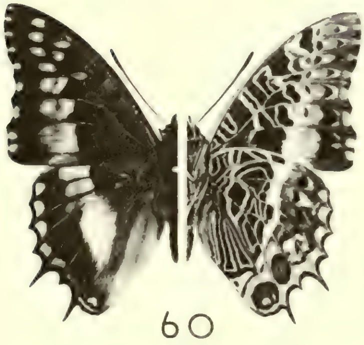
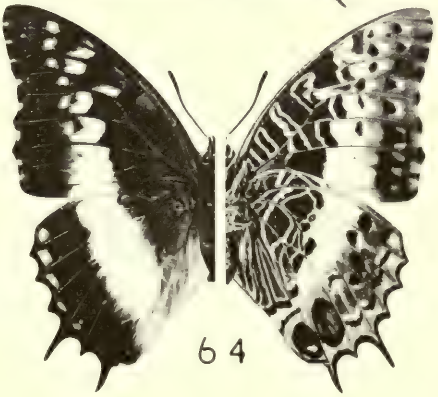


60



64

PLATE 8

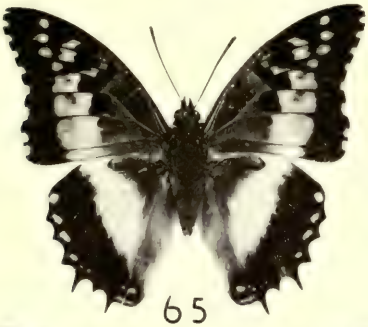
Charaxes

Figs. 65 and 69, 66 and 70. *ansorgei kungwensis* ssp. n., Holotype ♂ and Allotype ♀ (Tanzania [Tanganyika] : Eastern side of Lake Tanganyika, Kigoma District, Buholo area, Kungwe Peninsular, Mahali Mountains), T. H. E. Jackson, leg., upper and undersides. Types in B.M. (N.H.).

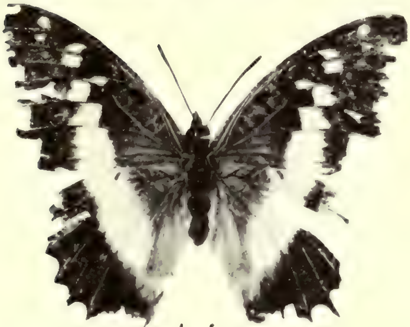
Figs. 67 and 71. *pollux geminus* Rothschild, Type ♂ (Malawi [Nyasaland] : Lauderdale), upper and underside.

Figs. 68 and 72. *pollux geminus* Rothschild, ♂ and ♀ topotypical form b (Malawi [Nyasaland] : Zomba), upper and undersides.

Approx. 2/3 natural size.



65



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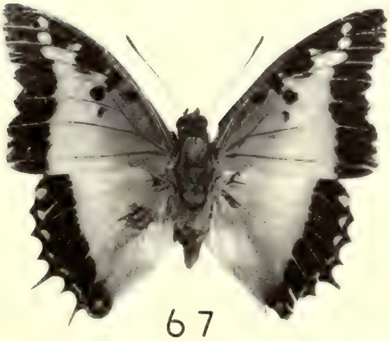
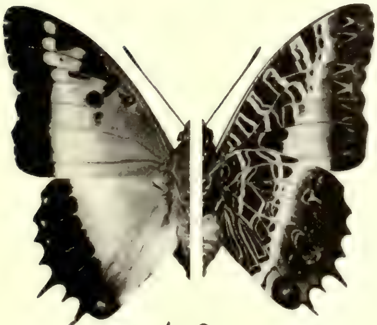
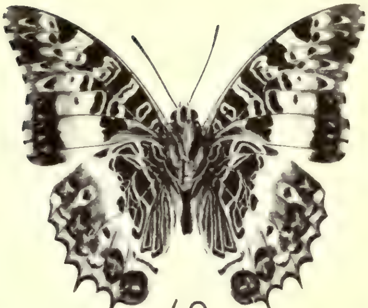


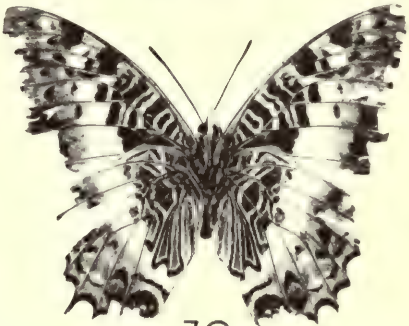
67



68



69



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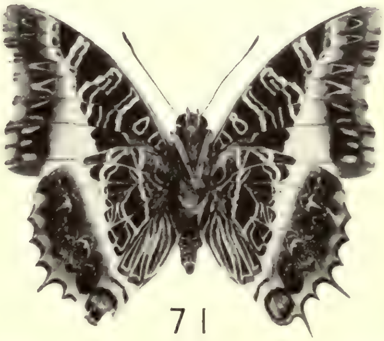
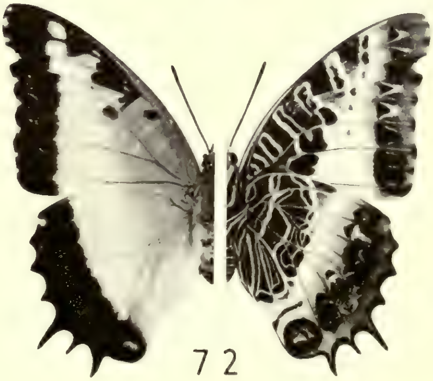


71



72

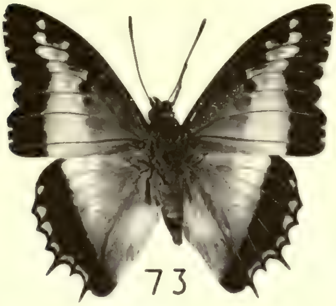
PLATE 9

Charaxes pollux Cramer

Figs. 73 and 77, 74 and 78. *gazanus* ssp. n., Holotype ♂ and Allotype ♀ (Portuguese East Africa: Amatongas), upper and undersides.

Figs. 75 and 79, 76 and 80. *pollux* Cramer, ♂ and ♀ (W. Uganda: Bwamba Valley), upper and undersides.

Approx. 2/3 natural size.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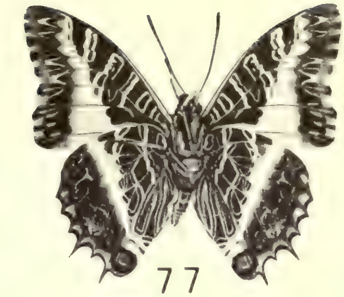
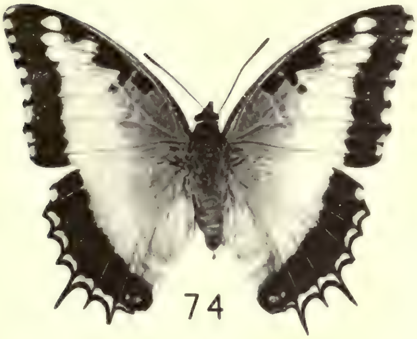
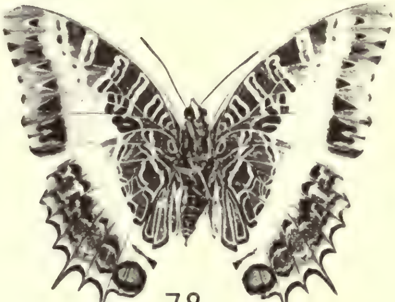
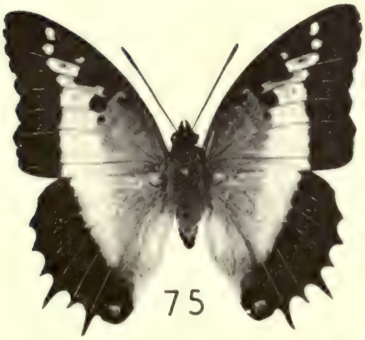
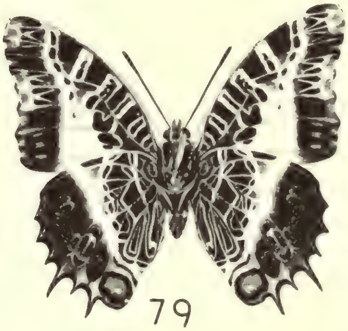
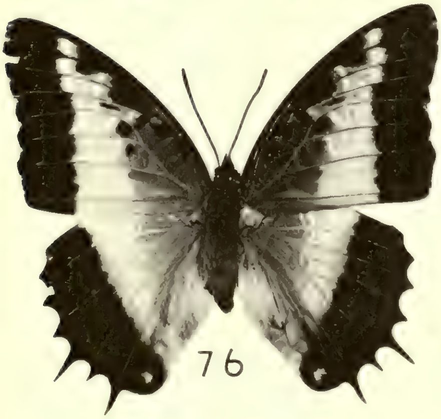

77

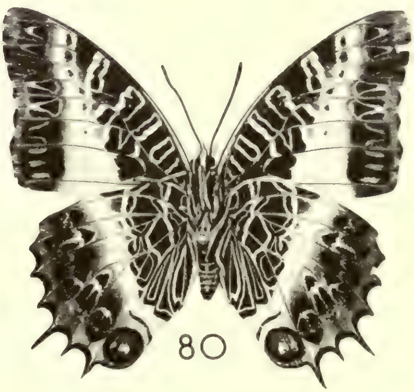

74


78


75


79


76


80

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INDEX TO VOLUME XVIII

New taxonomic names are in **bold** type

abyssinica, Antanartia 31
abyssinica abyssinica, Antanartia 31, 40 (fig.), 42 (fig.), 43 (fig.) Pl. 3
abyssinica jacksoni, Antanartia 31, Pl. 3
abyssinica vansomereni, Antanartia 31, Pl. 3
aculeata, Macromea 176
adami, Ceylonosticta 176
adami, Libellago 177
adjuncti, Polythore 177
aegypticus, Orosius 250
africanus, Echinopterogomphus 177
albimacula albimacula, Horaga 127
albimacula albistigmata, Horaga 129
albimacula anara, Horaga 128
albimacula anytus, Horaga 129
albimacula bilineata, Horaga 130
albimacula chalcedonyx, Horaga 128
albimacula malaya, Horaga 128
albimacula taweya, Horaga 129, Pl. 1
albimacula triumphalis, Horaga 130
albimacula viola, Horaga 127
albimacula violetta, Horaga 128
albistigma, Ischnura 177
albistyla, Gynacantha 177
albofasciata, Lestes 177
alpinus, Charaxes 98
alpinus alpinus, Charaxes 84–85, Pl. 12
alpinus nyikensis, Charaxes 85–86, Pl. 12
amethysta amethysta, Horaga 132
amethysta isna, Horaga 131, Pl. 1, 3
amethysta overdijkinki, Horaga 132
amethysta purpurescens, Horaga 131
amor, Rathinda 109–110, Pl. 1, 2
amphidon, Ancistrotermes 9
angustior, Rhipidocephala 170–171
anascephala, Drepanosticta 177
angularis, Lestes 177
annaimallaiensis, Macromia 178
annandalei, Caconeura 178
anomala, Indolestes 178
ansorgei ansorgei, Charaxes 303, Pl. 6
ansorgei jacksoni, Charaxes 304, Pl. 6
ansorgei kilimanjarica, Charaxes 309, Pl. 7
ansorgei kungwensis, Charaxes 306–307, Pl. 6
ansorgei levicki, Charaxes 307, Pl. 7
ansorgei ruanduna, Charaxes 305, Pl. 6
ansorgei rydoni, Charaxes 309, Pl. 7
antelopoides, Protosticta 178
apiaensis, Gynacantha 178
apicalis, Chloroneura 178
apicalis, Gynacantha 178
aquicola, Agriogomphus 179
arachnoides, Pseudocopera 179
argentatus, Nesophrosyne 241
argentatus, Orosius 242
argentatus, Orosius 245
argentatus novaebritanniae, Orosius 245
armageddoni, Chlorocypha 179
armstrongi, Amorphostigma 179
arthuri, Mortonagrion 179
asiatica, Indophlebia 179
assamica, Enallagma 180
assamica, Indolestes 180
atrocyana, Agrion 180
attenuatum, Aciagrion 180
atuberculata, Macromia 180
aubyni aubyni, Charaxes 77–78, Pl. 10
aubyni australis, Charaxes 79–80, Pl. 10
aubyni ecketti, Charaxes 78–99, Pl. 10
aurantiacum, Ceriagrion 180
auranticum, Ceriagrion 180
aurea, Tetrathemis 180
auricolor, Amorphostigma 180
auricolor, Gomphus 181
autumnalis, Caconeura 181
azureum, Aciagrion 181

bainbriggei, Gynacantha 181
bakeri, Ceriagrion 181
beesoni, Rhinocypha 181
bellicosa, Macromia 181
bellula albimacula, Horaga 128
berkeleyi, Charaxes 74–77, Pl. 11
bicornutus, Gomphus 182
bidentatum, Ceriagrion 182
bidentatus, Leptogomphus 182
bifenestrata, Rhinocypha 182
bifida, Tetrathemis 182
biguttata, Cephalaeschna 182
biharica, Gynacantha 182
bilineata, Melanoneura 182
binocellata, Agriocnemis 183
binocellata, Macromia 183
bispina, Macromia 183
borbonica, Antanartia 30
borbonica mauritiana, Antanartia 30, Pl. 3
borikhanensis, Macrogomphus 183
botti, Caconeura 183
burmicus, Microgomphus 184
butoloensis, Notogomphus 184
buxtoni, Ischnura 184

cacharicus, Lamellogomphus 184
cacuthis, Charaxes 70
caffra, Rhipidocephala 162–163
calcipennis, Microstigma 185
campioni, Disparoneura 185

campioni, Orogomphus 185
canberrensis, Orosius 247
canningi, Caconeura 185
cantonis, Orosius 247
cardinalis, Pseudophaea 185
carpenteri, Nilogomphus 185
carpenteri, Oxythemis 186
carpenteri, Tetrathemis 186
caudalis, Anisogomphus 186
cauvericus, Burmagomphus . . . 186
cavithorax, Ancistrotermes . 8 (figs.), 9–11
cellulosa, Orosius 239
cerinostigma, Protosticta . . . 186
cervus, Heliogomphus 186
chichibui, Gomphus 186
ciniata ciniata, Horaga . . . 132–134
clauseni, Agriocnemis 186
coerulescens, Caconeura 186
congoiensis, Rhipidocephala . 164–165
corniculum, Horaga 120
corona, Idionyx 187
coryndoni, Lokia 187
crucifer, Ancistrotermes . 7 (fig.), 8 (fig.), 11–13
cupricincta, Macromia 187
cupricolor, Hemicordulia . . . 187
curiosa, Protosticta 187
cuzneri, Rathinda 135
cyaneofrons, Gomphus 187
cyaneovittata, Esme 187

dabreui, Agriocnemis 188
davenporti, Ceylonolestes . . . 188
davenporti, Protosticta 188
decoloratum, Libyagrion 188
delius delius, Antanartia . 26, 40 (fig.), 41 (fig.), 43 (fig.) Pl. 1
delius guineensis, Antanartia 27, 40 (fig.), Pl. 1
delius f. **kamitugensis, Antanartia** . 26
denticauda, Tetrathemis 189
diminutivus, Onychogomphus . . . 189
dimorphica aethiopica, Antanartia 35, Pl. 5
dimorphica comoroica, Antanartia 35, Pl. 5
dimorphica dimorphica, Antanartia 33, 40 (fig.), 42 (fig.), 43 (fig.)
dimorphica mortoni, Antanartia. 36, Pl. 5
dingavani, Onychogomphus . . . 189
disarmatus, Lestes 189
distincta, Rhipidocephala . . 157–158
divestita, Rhipidocephala . . . 156
dobsoni, Agriocnemis 189
dolorosa, Pacificagrion 189
donaldi, Anaciaeschna 189
donaldi, Indomacromia 189
doornensis, Rhipidocephala . . 169
dorothea, Lestes 190
drummondi, Lamellogomphus . . . 190
duarensis, Burmagomphus . . . 190
duaricus, Onychogomphus . . . 190
dubia, Porpacithemis 190
dundomajoricus, Phyllogomphus . . 190
dundominusculus, Phyllogomphus . . 190

echinoccipitalis, Onychogomphus . . 190
ellisoni, Macromia 190
eltoni, Phyllothemis 191
emolus, Anthene 257
emolus javanus, Anthene . . . 259
emolus minor, Anthene . . . 259
emolus modesta, Anthene . . . 259
engeli, Rhipidocephala . . 166–167
equatorius, Ancistrotermes . . 8 (fig.), 13
etesipe abyssinicus, Charaxes . 61–62, Pl. 5
etesipe etesipe, Charaxes. . 59–61, Pls. 4–5
etesipe gordoni, Charaxes . . 63, Pl. 6
etesipe patrizii, Charaxes . . . 62
etesipe pemba, Charaxes . . 64, Pl. 6
etesipe tavetensis, Charaxes . . 62, Pl. 6
ethalion ethalion, Charaxes . . 281, Pl. 1
ethalion ethalion fm. **aurantimaeula, Charaxes** 283
ethalion ethalion fm. ethalion, Charaxes 282, Pl. 1
ethalion ethalion fm. rosae, Charaxes. 284, Pl. 1
ethalion ethalion fm. swynnertoni, Charaxes 283, Pl. 2
ethalion kikuyuensis, Charaxes 296–297, Pl. 4
ethalion littoralis, Charaxes . . 294
ethalion marsabitensis, Charaxes 298–299, Pl. 5
ethalion nyanzae, Charaxes. . . 292
ethalion nyasana, Charaxes. 286, Pl. 1, 3
ethalion nyasana fm. **cithaeronoides, Charaxes** . . . . . 287, Pl. 3
ethalion nyasana fm. **demaculata, Charaxes** . . . . . 288, Pl. 3
ethalion nyasana fm. **imitans, Charaxes** 290, Pl. 2
ethalion nyasana fm. nyasana, Charaxes . 286
ethalion nyasana fm. **suppressa, Charaxes** . . . . . 288, Pl. 3
ethalion pondoensis, Charaxes . 285, Pl. 1
ethelae, Dysphaea 191
excelsa, Orolestes 191
extraordinata, Atoconeura . . . 191

filigranus, Thamnotettix . . . 236
fimbriata, Rhipidocephala . . . 167
flaviceps, Burmargiolestes . . . 191
flavicolor, Heterogomphus . . . 192
flavifrons, Notogomphus. . . . 192
flavipes, Rhipidocephala 159
flavocolorata, Macromia 192
flavovittata, Macromia 192
fletcheri, Gomphidia 192
fletcheri, Petaliaeschna 192
fujiacus, Gomphus 193
fujiama, Davidius 193
fulgurata, Charaxes . 92–94, 98, Pl. 15–16
fulva, Rhipidocephala . . . 158

galeata, Idionyx 193
gallagheri, Charaxes 94–96, 98, Pl. 15
gardneri, Hylaeothemis 194
gautama, Indagrion 194
gigantica, Anotogaster 194
gloriosa, Dysphaea 194
gracillima, Hemicordulia 194
guineensis, Ancistrotermes 8 (figs.), 14–15
gynostylus, Cyclogomphus 194

haemastigma, Ischnura 194
halba, Horaga 120
halei, Macromia 194
hamulata, Argia 194
hannyngtoni, Heterogomphus 194
hanumana, Gynacantha 195
hasimaricus, Burmagomphus 195
hearseyi, Protosticta 195
helena, Indolestes 195
hermionae, Allogaster 195
hetaerinoides, Leucopteryx 195
hilaryae, Rhinocypha 195
hincksi, Mnesarete 196
hippomene, Antanartia 32
hippomene hippomene, Antanartia 32, 40 (fig.), 42 (fig.), 43 (fig.)
hippomene madegassorum, Antanartia 33, Pl. 4
holothura, Horaga 121
Horaga 110–137
huallaga, Argia 196
huonensis, Anaciaeschna 196

icteroptera, Mnais 196
ida, Macromia 196
imbricata, Idionyx 196
immaculata, Zygonyx 196
incisura, Gynacantha 196
inconspicua, Rhipidocephala 157
indica, Hylaeothemis 196
indica, Indolestes 197
indica, Macromia 197
indicum, Pseudagrion 197
inflata, Ceylonolestes 197
infrequentula, Argia 197
inglisi, Lamellogomphus 197
inglisi, Stylogomphus 198
intermedia, Protorthemis 198
interrupta, Agriocnemis 198
intricata, Idionyx 198
irata, Macromia 198
irma, Megalestes 198
isis, Zygonyx 198

kalarensis, Heliogomphus 198
karkloof, Charaxes 98
karkloof capensis, Charaxes 83–84, Pl. 11
karkloof karkloof, Charaxes 81–83, Pl. 11
kerri, Amphithemis 198
kerri, Macrogomphus 199
kerri, Onychogomphus 199
kimminsi, Chlorogomphus 199
kimminsi, Macromia 199
klossi, Anotogaster 199
kodaguensis, Gomphidia 199
krishna, Aciagrion 199
kumaonensis, Davidius 199

lachrymosa, Pacificagrion 200
laidlawi, Burmagomphus 200
laidlawi, Idionyx 200
laidlawi, Pseudagrion 200
laidlawi, Rhinocypha 200
lankanensis, Ceylonosticta 200
laosica, Calopteryx 200
latinotus, Ancistrotermes 8 (figs.), 15–17
lefebvrei lefebvrei, Horaga 135
lefebvrei osma, Horaga 135
lefebvrei osmana, Horaga 136, Pl. 1, 3
lembomboensis, Ancistrotermes 15
leoni, Phyllomacromia 200
leucostigma, Disparoneura 200
libyana, Gynacantha 201
licates, Anthene 270
licates addenda, Anthene 271
licates dusuntua, Anthene 271
licates licates, Anthene 271
licates philetas, Anthene 271
lieftincki, Heliogomphus 201
lieftincki, Macromia 201
lieftincki, Rhodothemis 201
lilliputians, Microgomphus 201
lindgreni, Onychogomphus 201
lindgreni, Protosticta 201
longfieldae, Enallagma 201
longicauda, Bayadera 201
longistigma, Indogomphus 202
longistyla, Esme 202
loogali, Microgomphus 202
loringae, Philoganga 202
lotophagorum, Orosius 241
lycaenina, Anthene 269
lycaenina lycaenina, Anthene 269
lycaenina lycambes, Anthene 269
lycaenina miya, Anthene 269
lycaenina togata, Anthene 269
lycaenina villosina, Anthene 270
lycaenoides, Anthene 270
lycaenoides bogorensis, Lycaenesthes 269
lycaenoides lycaenoides, Anthene 270
lycaenoides godeffroyi, Anthene 270
lycaenoides pegobates, Anthene 270
lycaenoides sutrana, Anthene 270
lycaenolus, Anthene 267
lyttoni, Gynacantha 202

mackwoodi, Caconeura 202
maenala syrinx, Horaga 120–121, Pl. 1
magnus, Paragomphus 202
makoka, Argia 202
malabarensis, Epophthalmia 203
malabarensis, Lamellogomphus 203
malabarica, Lestes 203

malabaricum, Pseudagrion 203
malcolmi, Brachydiplax 203
malloryi, Davidius 203
manica, Charaxes 86–91, 98, Pl. 13–14
manicata, Rhipidocephala 167–168
Margaritola 149
marieps, Charaxes 80–81, 98, Pl. 11
martini, Charaxes 96–97, Pl. 16
martini, Davidioides 203
martini, Platygomphus 203
mascarenica, Nesocordulia 203
medusa, Protosticta 203
melera, Horaga 135
microdens, Ancistrotermes 8 (fig.), 17–18
mildredae, Ischnura 204
millardi, Gynacantha 204
miniata, Macromia 204
minima, Idionyx 204
mirabilis, Margaritola 153
mirabilis, Rhipidocephala 153–4
mishuyaca, Argia 204
mollusca, Argia 204
montana, Coeliccia 204
montanus, Phyllogomphus 204
morio, Rhipidocephala 163
mortoni, Protosticta 205
moundi, Phyllogomphus 205
mudiensis, Esme 205
multinervosa, Devadatta 205

nadganiensis, Idionyx 205
naia, Agriocnemis 205
nietneri, Ceylonosticta 206
nigra, Caconeura 206
nigrescens, Vestalis 206
nigriceps, Lestes 206
nigricolor, Hagenius 206
nigroflavum, Ceriagrion 206
nigrolineatus, Anax 206
nilgiriensis, Phyllomacromia 207
nocturnalis, Periaeschna 207

obscura, Indoneura 207
obscurata, Rhipidocephala 154
occidentalis, Phyllogomphus 207
odoneli, Caconeura 207
odoneli, Gomphus 207
odoneli, Gynacantha 207
olympicus, Chlorogomphus 207
onyx akronyx, Horaga 118, Pl. 1
onyx cingalensis, Horaga 114–115
onyx fruhstorferi, Horaga 117–118, Pl. 1
onyx moltrechti, Horaga 118
onyx onyx, Horaga 115, Pl. 1
onyx rana, Horaga 116
onyx sardonyx, Horaga 116–117
onyx zuniga, Horaga 116
onyxitis, Horaga 128–129
orientalis, Phyllogomphus 207
ornata, Idionyx 208

pacifica, Hemicordulia 208
pallida, Macromia 208
pallidistigma, Calilestes 208
pallidum, Ceriagrion 208
paludensis, Aciagrion 208
papavarina, Hetaerina 209
paradoxa, Charaxes 67–68, 70, Pl. 8
paraffinis emoloides, Anthene 263
paraffinis matthias, Anthene 264
paraffinis nereia, Anthene 266, Pl. 1–2
paraffinis nissani, Anthene 264
paraffinis paraffinis, Anthene 263
Paroxynoton 149
patricia, Lestes 209
pembanus, Charaxes 70–72, Pl. 9
penricei dealbata, Charaxes 66, Pl. 7, 8
penricei penricei, Charaxes 65, Pl. 7
penricei tanganyikae, Charaxes 67, Pl. 8
periphrasis, Ancistrotermes 8 (fig.), 18–20
periyashola, Idionyx 209
peruviensis, Protoneura 209
philo philo, Anthene 266
philo scintillans, Anthene 267
pinheyi, Lestes 209
pinheyi, Nepogomphoides 209
platyceps, Gomphidia 209
platystigma, Ceriagrion 209
pollux gazanus, Charaxes 314, Pl. 9
pollux geminus, Charaxes 313, Pl. 8
pollux maua, Charaxes 316
pollux pollux, Charaxes 311
pollux zingense, Charaxes 313
polychromatica, Drepenosticta 209
poungyi, Coeliccia 209
praeclarum, Pseudagrion 209
prateri, Pseudotramea 210
preciosus, Orogomphus 210
protostictoides, Protoneura 210
pruinans, Heliogomphus 210
pruinosa, Metacnemis 210
pulcherrima, Ceylonicolestes 210
pulcherrimus, Onychogomphus 210
punctulata, Holcocephala 152

quadrifaria, Rhipidocephala 169
quadrilateralis, Aeschna 210

ramburi, Crenagriocnemis 211
ramburi, Indoneura 211
rarasana, Horaga 136, Pl. 1, 3
reducta, Uracis 211
rhinoceroides, Idionyx 211
risi, Gomphus 211
risi, Indoneura 211
robertsi, Notiothemis 211
robusta, Protosticta 211
rufimargo, Pseudodipsas 272
rusticatus, Mesogomphus 211
ruwensoriensis, Tetrathemis 211

saffronata, Idionyx 212
samoensis, Pseudagrion 212
sanguinostigma, Ischnura 212
sanguinostigma, Protosticta 212
schaenia diluta, Antanartia 29, Pl. 3
schaeneia dubia, Antanartia 29, Pl. 29
schaeneia schaeneia, Antanartia 28, 40 (fig.), 41 (fig.), 43 (fig.), Pl. 1
schmidti, Onychogomphus 212
scutata, Rhipidocephala 166
seductus, Macrogomphus 212
selina, Horaga 134, Pl. 1, 3
seltuttus, Anthene 259
seltuttus affinis, Anthene 262
seltuttus amboinensis, Anthene 261
seltuttus keyensis, Anthene 261
seltuttus seltuttus, Anthene 262
seltuttus violacea, Anthene 262
selysi, Chlorogomphus 213
semitestacea, Rhipidocephala 152–153
shanensis, Macromidia 213
siamensis, Burmagomphus 213
siamensis, Pseudagrion 213
signata, Rhipidocephala 163–164
sinuatus, Burmagomphus 213
smithi, Crocorthetrum 213
souteri, Disparoneura 213
spatula, Lestes 214
speciosa, Rhipidocephala 168
spencei, Pseudagrion 214
stevensi, Davidius 214
stevensi, Idionyx 214
stevensi, Protosticta 214
stevensoni, Gynacantha 214
striatus, Onychogomphus 214
subaequistyla, Copera 214
submontana, Ceylonosticta 215
subplatystyla, Anisopleura 215
subtropica, Ceylonosticta 215
superbus, Megalogomphus 215
superplatypes, Copera 215
sylvatica, Macromia 215
syrinx artontes, Horaga 119–120, Pl. 1
syrinx camiguina, Horaga 123
syrinx decolor, Horaga 122
syrinx joloana, Horaga 122
syrinx moulmeina, Horaga 119
syrinx onychina, Horaga 121
syrinx paulla, Horaga 122–123
syrinx permagna, Horaga 124
syrinx pririgna, Horaga 122
syrinx samoena, Horaga 124–125
syrinx schoutensis, Horaga 126, Pl. 1
syrinx sikkima, Horaga 119
syrinx syrinx, Horaga 125

t-coerulea, Indoneura 215
tenaculatus, Libyogomphus 216
tenera, Rhipidocephala 161
theebawi, Caconeura 216
tigrina, Rhipidocephala 156
tigrinum, Paroxynoton 156–157
tillyardi, Palaeothemis 216
tonkinicus, Onychogomphus 216
travancorensis, Idionyx 216
trifoliata, Argia 216
trilobata, Protosticta 216
trinervulata, Heliaeschna 216
trituberculata, Macromia 216
trotteri, Pseudocopera 216

umbriaca, Argia 217
umbripennis, Rhipidocephala 159–161
uncata, Protostrata 217
unguiculata, Idionyx 217
unifasciata, Periaeschna 217
usambarae, Charaxes 73–74, Pl. 9

vallisi, Phasmosticta 217
varralli, Mortonagrion 217
veronica, Indolestes 217
versicolor, Telebasis 217
v-flavum, Burmagomphus 217
victoria, Agriocnemis 217
villosa, Anthene 271
vinsoni, Ischnura 217
violetta, Charaxes 51, Pl. 2
violetta maritima, Charaxes 52, Pl. 3
violetta meru, Charaxes 53, Pl. 4
violetta violetta, Charaxes 50, Pls. 1–3
violacea, Coenagrion 218
viridata, Rhenagrion 218
viridis, Drepanosticta 218
vitrinella, Rhinocypha 218

walli, Ceylonosticta 218
walli, Dysphaea 218
walli, Heliogomphus 218
walli, Onychogomphus 218
wasmanni, Ancistrotermes 20
wheeleri, Gomphidictinus 218
wilkinsi, Cyclogomphus 218
williamsoni, Gomphidia 218
williamsoni, Pseudagrion 219
wynaadicus, Macrogomphus 219

xanthoptera, Orogomphus 219

zallorensis delineatus, Davidius 188
zeylanica, Macromia 219
zumpti, Rhipidocephala 161–162

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xl